

A Hayden Publication

October 1982 \$2.50

Canada &
International
\$2.95

PERSONAL COMPUTING

The Smart House

Cramming For SAT Exams

Better Cash Flow

Managing Athletes

How Much Memory?

Portable Computing

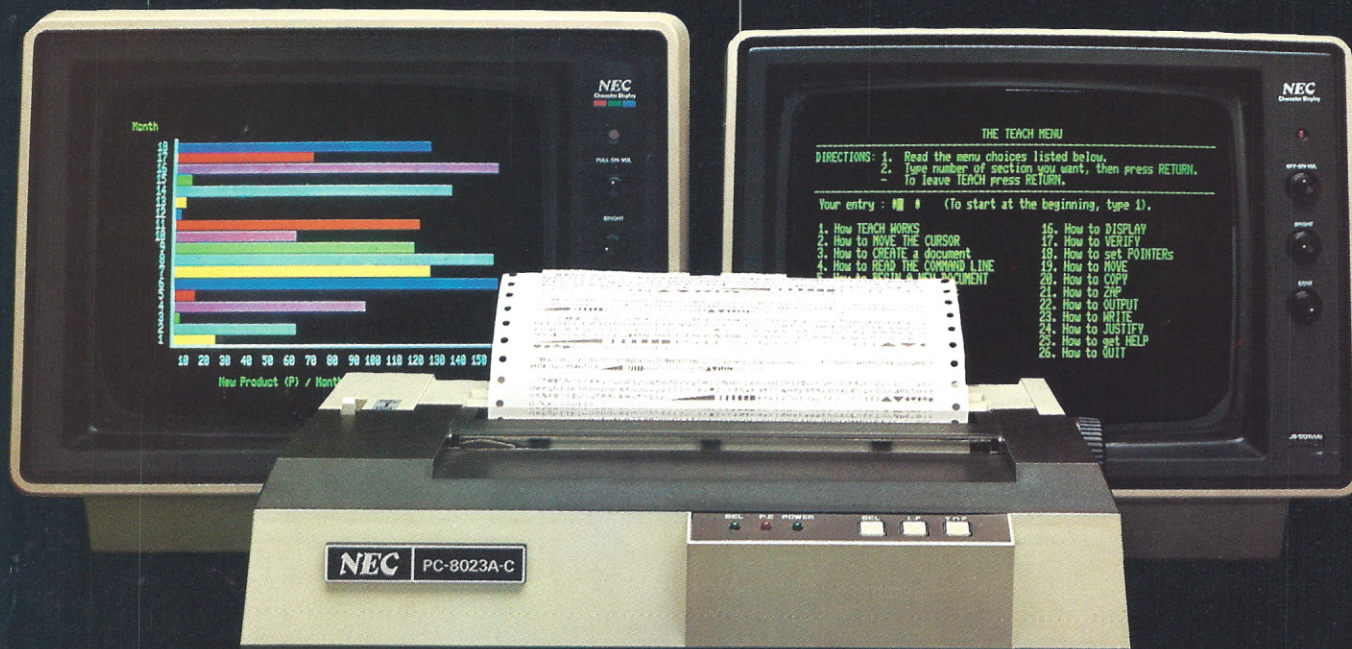
**How Much
Should You
Pay For
Your Computer?**

\$\$\$\$\$\$\$\$



NEC's crisp, clear, high-performance JC1203 RGB color monitor, an industry standard. Also available, the JC1201 composite video version.

NEC's classic JB1201 green monitor, one of microcomputing's performance legends. Easy on the eye, and the checkbook.



Our impressive new NEC dot matrix printer. Parallel interface, 100 cps, 2K buffer, pin or friction feed. Stunning performance and compatibility in the hottest new peripheral of the year.

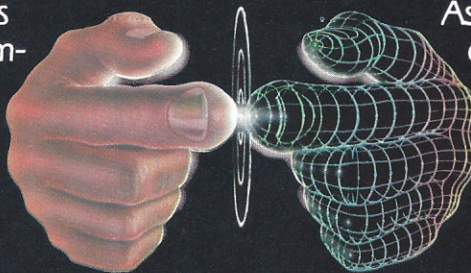
Give your IBM system some NEC, and watch its performance soar.

Peripherals from NEC can make almost any computer system better.

Our sparkling new JC1203 color monitor is plug and pin compatible with the 16-color IBM® PC, and delivers the bright, sharp, clear, and stable screen image for which the entire NEC line has long been famous. Similar compatibility is available to owners of Apple II®, Radio

Shack®, and Atari® computers, not to mention our own outstanding NEC PC-8000 series. Also available is a brand new, extremely low cost, NEC green monochrome monitor, the JB1260, perfect companion for an Osborne®, for instance.

Ask your dealer for a demonstration. Or write us at 1401 Estes Avenue, Elk Grove Village, IL 60007.



**Productivity
at your fingertips™**

NEC

**NEC Home Electronics (U.S.A.), Inc.
Personal Computer Division**

Nippon Electric Co., Ltd., Tokyo, Japan

Mountain Computer Presents The Hard Disk System with Dynamic File Allocation

Long before you are out of space
on our system, other disk systems
will have given up!

The DYNAMIC 5M Disk System™ with—
The Mountain Virtual File System (MVFS)™
software:

- Uses dynamic file allocation which automatically consumes file space only when needed, not when initialized.
- Makes available up to 50% more disk space than competitive units and uses no extra memory space.
- Allows large files, up to 5 MBytes for database applications in CP/M and Pascal.
- Supports DOS, CP/M, & PASCAL for Apple II and MS DOS & CP/M 86 for the IBM Personal Computer.

QUALITY — The Mountain Computer reputation for quality peripherals combined with a one year warranty.

RELIABILITY — The dependable disk system from a leading supplier of personal computer peripherals, with a service organization to support it.

**DYNAMIC 5M Disk System™...
for the Apple II and the IBM PC.**
(available soon for other systems)

(Includes everything you need: disk controller, power supply, interface card, cabinet, cabling, and the Mountain Virtual File System software.)

See your local computer store for
this and other innovative
Mountain Computer Products.



Mountain Computer
INCORPORATED

300 El Pueblo Rd. Scotts Valley, CA 95066
TWX: 910 598-4504 (408) 438-6650

Quality and Performance,
at an affordable price — \$2,695.

CIRCLE 2

Apple II is a trademark of Apple Computer, Inc. CP/M and CP/M 86 are trademarks of Digital Research, Inc. MS
DOS is a trademark of Microsoft. IBM PC is a trademark of IBM.

October 1982
Volume 6 Number 10
A Hayden Publication

PERSONAL COMPUTING

EDITOR

Paul Kellam

SENIOR EDITORS

David Gabel
Michael Rogers

ASSOCIATE EDITORS

Jeffrey Rothfeder
Lee Thé

ASSISTANT EDITOR

Elli Holman

PRODUCTION EDITOR

Cecilia Wessner

EDITORIAL RESEARCHER

Bette Schwartzberg

EDITORIAL ASSISTANTS

Susan Jelcich
Dorie MacDonald
Carol Rapp

DESIGN & ART CONSULTANT

Robert G. Bryant

PRODUCTION MANAGER

Vince Cicenía

PRODUCTION ASSISTANT

Carol Tabak

BUSINESS MANAGER

Greg Miller

PROMOTION MANAGER

Leslie Bouffard

NEWSSTAND CONSULTANTS

George Carleton & Assoc.

CIRCULATION CONSULTANT

John D. Klingel

CIRCULATION DIRECTOR

Barbara Freundlich

CIRCULATION MANAGER

Robert Paratore

READER SERVICE

Paula Greenleaf

MANAGER OF REPRINTS

Maxine Sassano

MANAGER OF DEALER SERVICE

Merri Hollander

PUBLISHER

Robert J. Lydon

COVER PHOTOGRAPHY

GEORGE B. FRY III

335,000 copies of this issue printed

DEPARTMENTS

5 Editorial

7 Letters

13 Answers

18 Outlook

33 Interview

Harry Garland on the future and the S-100 bus

47 Essay
Don't be intimidated—computing is easier than it looks

149 Book Reviews

166 Games

198 Hardware Of The Month

208 Hardware Index

222 Software Of The Month

232 Software Index

265 Personal Computing Dealers

271 Advertisers' Index

FOR SUBSCRIBER CHANGE OF ADDRESS: Fill out coupon in this issue. Attach old mailing label, or write in your subscriber ID# which appears above your name. Fill new address information and send to Personal Computing, P.O. Box 2942, Boulder, CO 80322. Allow 6-8 weeks for address change to become effective. BACK ISSUES OF PERSONAL COMPUTING are available on microfilm, microfiche, 16mm or 35mm roll film. They can be ordered from Serials Processing Dept., University Microfilms International, 300 North Zeeb Rd., Ann Arbor, MI 48106. For immediate information, call (313) 761-7400. HAYDEN PUBLISHING CO., INC., PUBLISHERS: Electronic Design; Computer Decisions; MicroWaves; Personal Computing; Electronic Design's Gold Book; MicroWaves' Product Data Directory; Hayden Books; Hayden Software. PERSONAL COMPUTING (ISSN 0192-5490) is published monthly by Hayden Publishing Company, Inc., 50 Essex St., Rochelle Park, NJ 07662. James S. Mulholland, Jr., President. Printed at World Color Press, Inc., Mt. Vernon, IL. Second class postage paid at Saddle Brook, NJ and at additional mailing offices. Copyright© 1981, Hayden Publishing Company, Inc. All rights reserved. POSTMASTER: Please send form 3579 to PERSONAL COMPUTING, P.O. Box 2942, Boulder, CO 80322. Subscription rates: U.S. 1 year (12 issues) \$18; 2 years (24 issues) \$33; 3 years (36 issues) \$46. Canada & Mexico: add \$4/year for surface mail, \$8/year for airmail. Other countries: add \$8/year for surface mail, \$36/year for airmail. Back issues: U.S.: \$4. All other countries: \$5. Audited Paid Circulation.

Cover story begins on page 58.
How much should you pay
for your personal computer?

FEATURES

50 PROFESSIONAL/MANAGERIAL
Could (Should?) An Athlete Be Perfect?

By Jeffrey Rothfeder

Major league baseball teams are using sophisticated player evaluation software to help their athletes achieve perfection. And managers in many businesses might well turn to some of these techniques.

58 PROFESSIONAL/MANAGERIAL
What Should You Pay For Your Computer?

By Jim Powell

The answer isn't a simple one—you must take some factors into account. But the immediate benefits of owning the computer will far outweigh its cost.

69 PROFESSIONAL/MANAGERIAL
Hand-Held Computers: More Than A Curiosity

By Richard Hoffman

They were once thought of as glorified calculators, but hand helds are now taking their place with the giant computers of a few years ago.

76 BUSINESS
When Personal Computing Becomes Impersonal

By David Gabel

Institutions seem to get in the way of personal activity, and computing is no exception. It can even happen inside companies in the computing industry.

82 BUSINESS
The Small Business Was Under Financial Siege

By Theresa Engstrom

Cash flow was a big problem. This company solved its dilemma with an accounts-receivable package that put cash flow back on the right track.

88 SPECIAL REPORT
More Computer Muscle To Power The Machine

By Lee The

No matter how much memory you have, the day will come when you decide you need more. This report gets you started on the correct use of more memory for extra computing power.

112 HOME
The Smart House Comes Of Age

By Mike Barlow

Architects have had ideas for today's homes that often were beyond the reach of the homeowner. Now the personal computer is changing all that.

121 EDUCATION
SAT Tutoring Programs: Give Them An Incomplete

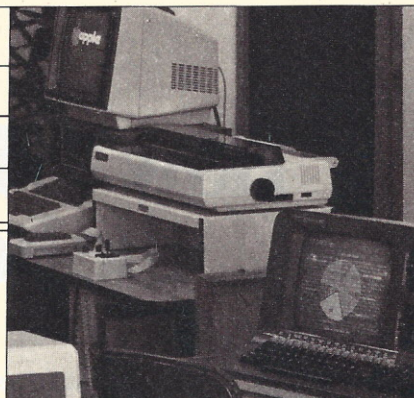
By Tom Cullem

When a test can determine a student's future the way the College Board tests do, cramming can be a real chore. Personal computing is beginning to make that easier, but it's too early to tell what the impact is on test scores.

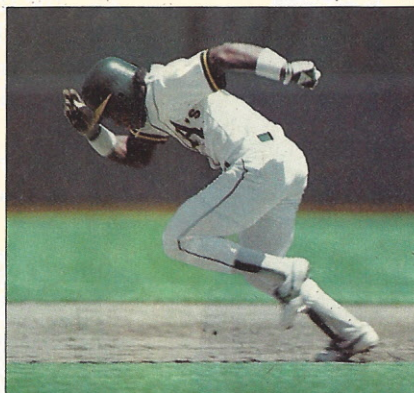
132 ADVANCED
Programming For The Written Word

By Leon Starr

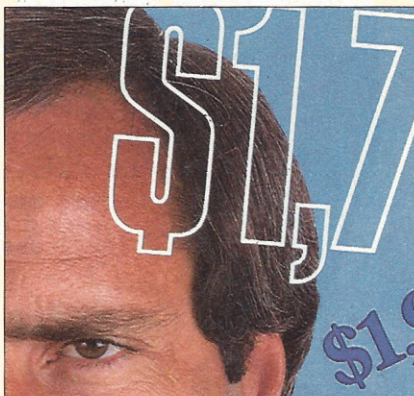
Word processing may be one of the most common computing applications, but our Desk Master programmer found that universality isn't synonymous with simplicity. Word processing turned out to be a tough nut to crack.



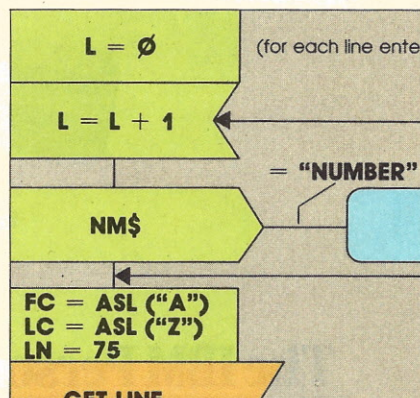
COVER



PAGE 51

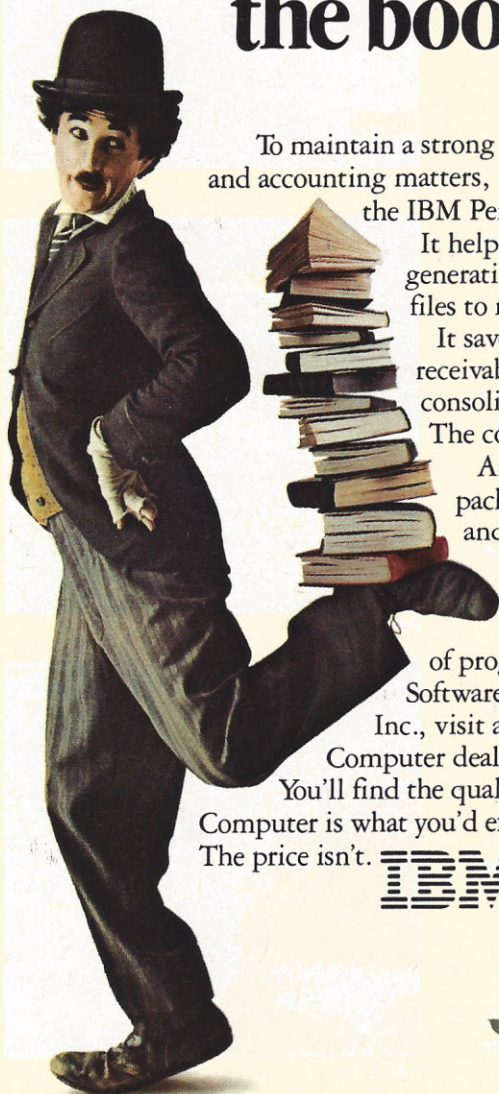


PAGE 59



PAGE 133

How to balance the books.



To maintain a strong foothold in financial and accounting matters, a businessperson could use the IBM Personal Computer.

It helps with accounts payable by generating everything from vendor files to month-end credit records.

It saves time on accounts receivable by printing invoices and consolidating multiple transactions. The computer even writes checks.

And it uses general ledger packages that improve control and productivity today, so you won't be off balance tomorrow.

To get an in-depth account of programs from both Peachtree Software Inc. and BPI Systems, Inc., visit an authorized IBM Personal Computer dealer.

You'll find the quality of the IBM Personal Computer is what you'd expect. The price isn't.

IBM



The IBM Personal Computer A tool for modern times

For a store near you (or information from IBM about quantity purchases) call (800) 447-4700. In Illinois, (800) 322-4400. In Alaska or Hawaii, (800) 447-0890.

CIRCLE 3

COMING NEXT MONTH

Voice Command

Speak and it computes. That's the promise of the future. Here's a look at the state of the art—what's available now, what's likely to be available when, and what computers that listen will be able to do for you.

Comfortable Computing

Computers extend the human mind, but the body has to fit in, too. We'll share what users have learned—sometimes the hard way—about furniture and workstation configurations.

As Christmas Draws Nigh

Santa might want to think about a super family gift. What are the considerations for the family system—a system for the home? We'll give you some alternatives to ponder, together with some hints to drop in case Santa wants to receive as well as give.

Controlling Payables

When a business (or a family) pays bills too quickly, cash runs short. When payment is too slow, credit is imperiled. Here's how to use personal computing to pay the payables at just the right time.

The Electronic Salesman . . .

May never replace the human huckster, but a personal computer can give a big assist—particularly when the customer must deal with an overload of choices. We'll take you through the development of a selling application that can be adapted to a wide range of situations.

Business Planning Software

Planning means arranging things so that people, work and money flow smoothly and together. Budgeting is the key to planning. We'll describe the systems for "what-iffing" that you might want to plan to use.

If you're looking for a terse dollars and cents figure representing how much to pay for a computer, you won't find it in our cover story, which starts on page 58. The reason is that there is no such figure—no one neat price that's right for everyone, nor even for anyone.

If you're looking for considerations to weigh in order to figure out how much you should pay for your computer, we think we may be of some help.

"How much should I pay?" is a question that we at *Personal Computing* are frequently asked. When we set out to try to answer it we found that the only answer, in essence, was "as much as you want to, but no more than you have to." For an individual, the first part of that answer relates to the checkbook balance. The last part relates to the value put on what you expect the computer to do for you.

As we talked to readers about values and expenditures, it became clear that, almost universally, their expectations were exceeded by whatever computer they chose. No one we ran into felt that he had paid too much. Many wished they had bought more, and planned to buy more.

Nevertheless, there is that practical matter of available resources. We hope "How Much Should You Pay for Your Computer?" will help you bring your resources, your needs and the computer you buy into the same ballpark.

A reader was telling us the other day about the time his printer started eating paper. It would pull a page or two through the tractor feed OK. But then the paper would start inexorably edging leftward as it continued to print. Eventually it would pull the paper out of the tractor-feed holes and then joyously chew the paper up while the printhead deliberately placed lines of copy one on top of another.

Our friend and his printer struggled for hours. He'd carefully realign everything, make sure all the levers and bars were closed properly, refeed the paper into the printer and start it up again. And again, it would pull its Jaws routine. Finally, in despair, he started pouring over the manual, plowing through the cutesey language that so

many in the computing industry think passes for "user friendliness."

Finally our friend noticed a footnote hinting that the platen-release lever has to be open in order for the tractor feed to work. Many printers, his included, pull paper through in one of two ways—friction feed, like a typewriter, and tractor feed. If you try to get the printer to do both at once—which turned out to be the case in this case—the two systems fight, and your print-out is the loser by a knockout.

Our friend now says that although he still will not read the owner's manual for a new car, he will read the manuals for computer equipment. He also says that in the future he will try to figure out what's happening before he tries to fix it.

That leads us to consider sharing some of our own learning experiences—knowledge we didn't particularly want to gain but are glad we did.

And that leads us to invite you to share your own knowledge—whether it has been gained objectively or the hard way—through the pages of *Personal Computing*.

What funny thing happened to you on the way to the disk drive? What tips do you have that someone else could use? What secrets have you uncovered that no one else yet knows? What anecdotes have you to tell that reveal the hidden personalities and quirks behind these things called personal computers?

We'll pay you to share—up to \$25 for up to 250 words, which is about one full page of unchewed printout paper. Send your gems of wisdom to Gems of Wisdom Editor, *Personal Computing*, 50 Essex St., Rochelle Park, NJ 07662.

If you have longer, more significant stories to tell—something that might make a major article—we'd like to hear about those, too. It's best to query, with a brief description. If your story is something we think publishable we'll be eager to work with you to perfect the manuscript. Address your queries to The Editors.



Editor

OsborneTM brings you the comparison IBM[®] and Apple[®] don't want you to see.

Other computer companies dazzle buyers with an array of options and add-ons that makes the final price hard to determine and makes the computer hard to buy, complex to assemble, and very difficult to carry.

We believe in making personal computers that are easy to learn and use. And that starts with making computers easy to *buy*.

The Osborne 1TM Personal Business Computer. One simple price, \$1795, buys it all.

And it all comes in a portable case you can take with you wherever you work. Because once you go to work with an Osborne, you won't want to work

any other way.

For your nearest dealer, call (in California) 800 772-3545, ext. 905; (outside California) call 800 227-1617, ext. 905.



OSBORNE
COMPUTER CORPORATIONTM

	OSBORNE 1 TM	IBM PERSONAL [®]	APPLE II [®]
Computer with 64K RAM, two floppy drives ^A , keyboard and CRT:	\$1795	\$3240 ^B	\$3120 ^C
Serial communications:	INCLUDED	EXTRA COST	EXTRA COST
Modem Connection:	INCLUDED	EXTRA COST	EXTRA COST
IEEE 488 Instrument communications:	INCLUDED	EXTRA COST	EXTRA COST
BASIC interpreter ^D :	INCLUDED	INCLUDED	INCLUDED
Business BASIC ^E :	INCLUDED	EXTRA COST	EXTRA COST
CP/M [®] Control Program:	INCLUDED	EXTRA COST	F (see below)
Word Processing ^G :	INCLUDED	EXTRA COST	EXTRA COST
Electronic Spreadsheet ^H :	INCLUDED	EXTRA COST	EXTRA COST
Carrying Case:	INCLUDED	EXTRA COST	EXTRA COST
TOTAL PRICE^I:	\$1795	\$4000-4700	\$4000-4700

A. The Osborne 1TM includes two built-in 100K byte floppy disk drives. The IBM[®] and APPLE II[®] drives provide approximately 160K bytes of storage. **B.** From the IBM Product Center Personal Computer Price Schedule. **C.** From the Apple Computer Suggested Retail Price List. **D.** The Osborne includes MBASIC[®] from Microsoft. **E.** The Osborne includes CBASIC[®], a business-oriented BASIC language from Digital Research. **F.** The Osborne includes CP/M[®], the industry-standard control program from Digital Research. The list of software packages which will run with CP/M is considerable. IBM offers CP/M 86 (a version of CP/M) at extra cost. There are optional hardware systems which allow the Apple II to run CP/M; the Apple II control program is highly comparable to CP/M. **G.** The Osborne includes WORDSTAR[®] word processing with MAILMERGE[®]—products of MicroProTM International. **H.** The Osborne includes SUPERCALCTM, the electronic spreadsheet system from Sorcim Corporation. **I.** Exact price comparisons cannot be presented, because the software and hardware options chosen to create the "equivalent" of the Osborne 1 Personal Business Computer vary in price. The range indicated was computed using price lists from IBM and Apple. Documentation of the computations are available on request from Osborne Computer Corporation. Trademarks: OSBORNE 1: Osborne Computer Corporation; SUPERCALC: Sorcim Corporation; Digital Research: Digital Research, Inc.; Registered Trademarks: WORDSTAR, MAILMERGE: MicroPro International Corporation of San Rafael, CA; MBASIC: Microsoft; CBASIC, CP/M: Digital Research, Inc.; IBM: IBM Corporation; Apple II: Apple Computer Corporation.

Touting The Use Of Terminology

In your article, "Word Processing for Personal Computers," on page 82 of the August 1982 issue, your term "maximum document size" is an excellent way of referring to a very elusive specification of word-processing programs. I was disappointed that I did not see any further reference to the topic.

It would have been most useful to know the maximum document size for the various programs, and also if any of them support any of the many extra memory products on the market.

One approach to increased document size is to automatically access the disk in order to move back and forth in the document. I never thought this was practical with floppy disk drives, but this idea, when combined with a drive simulated in RAM (or a hard disk), becomes very interesting.

David A Werblo
WALNUT CREEK, CA

COMPUTER SOFTWARE THAT HELPS CULTIVATE CROPS

I read with interest George DeVault's article, "Computers Let Farmers Get Back to the Soil," on page 46 of the August 1982 issue. The software mentioned has a great potential for improving farm management.

In addition to the companies listed in the article that offer agricultural soft-

ware, I would like to add the name of Small Business Computer Systems. Located in Lincoln, Neb., our company is marketing an agricultural accounting system that can be used in a variety of agricultural operations with a number of different enterprises.

We seek input from users as to the kinds of software they need for their operations. I would also be happy to speak with groups in the area that are helping farmers to computerize.

Diane Walkowiak
SMALL BUSINESS COMPUTER SYSTEMS
4140 GREENWOOD
LINCOLN, NE

E-MAIL SOFTWARE CONFUSION

Your article, "Electronic Mail Delivers the Executive Message," on page 32 of the June 1982 issue, was slightly incorrect with respect to The BDM Corporation. While it is true that BDM is providing an electronic-mail system under contract to the U.S. Army, this software was not developed from scratch by BDM. The original software was developed by Craig Vaughn of Software Sorcery (McLean, Va.). BDM is modifying this software under license for its particular application.

I would appreciate your bringing this information to your readers' attention.

Kevin W. Apsley
ASSOCIATE STAFF MEMBER
THE BDM CORPORATION
MCLEAN, VA

WHAT YOU CAN DO WHILE THE PRINTER PRINTS

The Outlook section of your August issue contained the article, "Personal Spooling" in which you listed various, print buffers and "spoolers." Technically speaking, "buffers are buffers and spoolers are software." All of the products you listed were hardware buffers, and you neglected to mention Doubletime Printer, which allows the Apple II to print in the background while doing other things in the foreground.

Doubletime Printer is the first general-purpose software package for the Apple II that effectively makes use of interrupts, a feature of mini and mainframe computers. With Doubletime Printer, users may print text, binary text or Applesoft files while they are programming or editing other files. Because Doubletime Printer uses disk files as its buffer, its buffer is effectively unlimited, unlike the 8k to 64k buffers listed in the article.

Among other software packages, PIE Writer word processing and The Correspondent include in their command structures commands to start, stop and restart Doubletime Printer and to create formatted data files. In fact, this letter was composed on PIE Writer while I continued to edit other files.

For users of the Apple II DOS, Doubletime Printer is an attractive, large capacity alternative to any of the other hardware buffers. And it costs only \$150.

Dan Fischer
PROGRAM DIRECTOR
EUPSYCHIA COMMUNICATIONS
AND MANAGEMENT CO.
BERKELEY, CA

SORTING OUT THE DATA BASE DIVERSITY

As one who counts on *Personal Computing* to help me keep current on the computer industry, I was dismayed to see Lockheed Corp.'s DIALOG referred to as dealing primarily with legal issues ("Data Bases Fulfill Needs On Demand," July 1982, page 32).

The DIALOG system has one of the most diverse offerings around, as a glance at the systems catalog would confirm. Two other systems (SDC and BRS) that offer a wide range of data bases weren't even mentioned.

S.C. Rainey
UNIVERSITY OF CALIFORNIA, BERKELEY
DEPARTMENT OF GEOGRAPHY
BERKELEY, CA

I read with interest your very informative primer on data bases, "Data Bases Fulfill Needs On Demand," on page 32 of the

"Hayden's *Personal Computing* magazine's accuracy policy: to make diligent efforts to insure the accuracy of editorial material. To publish prompt corrections whenever inaccuracies are brought to our attention. Corrections appear in 'Letters.' To encourage our readers as responsible members of our business community to report to us misleading or fraudulent advertising. To refuse any advertisement deemed to be misleading or fraudulent."

July 1982 issue. However, I feel I should offer some clarification on how Bob Bone gets his travel articles into our DEC 1170 system from his Xerox 820 in Honolulu.

The mechanics of it have nothing to do, per se, with a Texas Instruments terminal, as Bone suggests in his quotes in the article. Rather, he simply dials up the same remote entry telephone number that our reporters at city hall, the county courthouse, or on the road with local sports teams call when they are ready to transmit stories they have created on our TI 765 devices. We have been using some 30 TI 765 portable terminals for four years, which might have caused this confusion.

But Bone was certainly correct when he said that editors like this kind of on-line delivery of copy. Of course, it's not as much fun as in the old days when a reporter with a hot story called up the city room and yelled, "Hello sweetheart! Gimme a rewrite!" But it is vastly more efficient and, perhaps, a little less sexist.

We have programmed our TIs and four recently purchased Teleram Portabubble/81 remote entry terminals in accordance with American Newspaper Publishers Assn. (ANPA) standards, which were originally developed for the major wire services. Thus, local copy from outside the office comes into the systems with the same standard wire service header, including a keyword, priority code and category code, as is used by both the Associated Press and United Press International. The only difference is that this local copy comes in over a dial-up line at 300 baud, while AP and UPI come in at 1200 baud through two other separate ports in the computer—AP via a satellite dish behind our building, and UPI via dedicated AT&T lines.

Generally speaking, any newspaper with an editorial front-end system can receive copy from virtually any of the personal computers on the market that output ASCII and can be hooked up to a modem. Once we get the communications parameters set up and the protocols matched up with the wire-stripping algorithms in our DEC TMS-11 software programs, we can input. The system is configured so that nobody, not even our own reporters, can access our data base through this very narrow input window.

Bone was also incorrect in his description of his problem with "the traditional

journalist's paragraph symbol." That's not what his problem is at all; his problem concerns what's known in typesetting circles as a "quad left" command—a combination of a 1 and a carriage return, which is also known as a linefeed/carriage return. These often show up in random places in stories from some remote entry machines, apparently because the sending machine's end-of-line (EOL) transmission sequence is in the "in" mode rather than the "out" mode. For example, our wire-stripping program deletes all end-of-line hyphens and all line terminators. If a line ends with a space but does not begin with a space, a quad left is appended to it. The converse works the same way.

None of this is apparent to the sender. But, in any case, it's not a big problem for us. I have programmed a UDK (User Definable Key) on our editing terminals that automatically loops through the entire file looking for, and deleting, these unwanted quad lefts.

Richard T. Sullivan
ASSISTANT NEWS EDITOR, SYSTEMS PLANNING
SAN DIEGO TRIBUNE
SAN DIEGO, CA

A CALL FOR "BIG BLUE" SOFTWARE

I have an IBM Personal Computer and a fully configured PRISM 132 printer, and I continue to be fascinated by the myriad software ads I see in all of the computer magazines each month. However, most of the really fun programs—be they games, music synthesizers or graphics aids—seem to be aimed at owners of Apples or TRS-80s. Some of the problems (I am told) are due to the newness of the IBM as well as its non-standard 8088 microprocessor and lack of a "standard" operating system.

This letter is to urge all of you to work on powerful, user-friendly software capable of using the IBM for music and color, rather than sticking to "plain vanilla" business applications. I would like to see the IBM DOS—in either the DOS version 1.05 or the soon to be released DOS 2.0—become the standard operating system for the IBM.

There is a real market for software that will allow IBM users to make full use of the system, as well as all the nifty features of a fully configured PRISM

printer, without resorting to awkward "home-made" utility programs written in BASIC. I am starving for good software, and I know there are many other people in the same situation. There is some kind of myth floating around that the IBM machines are bought only by corporations for business use. My machine is owned by my corporation but I really bought it for me.

I suspect that lots of IBM owners are in similar boats. We really are a bunch of hobbyists who want all the games, graphics and music abilities that Apple and TRS-80 owners enjoy. Please don't let us down.

Bill Siebert
PRESIDENT BOLESKINE HOUSE, INC.
SPENCER, NY

IT'S WORTH A THOUSAND WORDS

Standard & Poor's provides a valuable information service built upon a tremendous base. While it is possible that somewhere at Standard & Poor's performance statistics on the Boston Red Sox might exist, the graphics used in your article, "Picture This—And Do It Yourself," on page 50 of the August issue, were not provided by them.

The graphics were, in fact, created by Business & Professional Software, Inc. (BPS), developers of such personal-computer business graphics packages as Apple Business Graphics and Screen Director. The charts of Red Sox performance are part of a demonstration package for Apple Business Graphics and PIK, its Printer/Plotter Installation Kit. PIK was also developed by BPS.

Sam Guckenheimer
DIRECTOR OF MARKETING
BUSINESS & PROFESSIONAL SOFTWARE, INC.
CAMBRIDGE, MA

THE "REAL CRISIS" IN EDUCATION

As a very recent subscriber to *Personal Computing* and a relative newcomer to the field of personal computing, I have read all of your recent (March-August) issues with the eager dedication of a new convert. Your August issue contained an article which sparked my interest most particularly.

As a retired educator, with 34 years as
(continued on page 169)

As IBM would design it

**The Personal Hard Disk™ from Corona™.
Only for the IBM Personal Computer.**

Corona specialization makes the difference:

It fits right in—right inside the IBM Personal Computer, with no external power supply.

And it makes friends fast—with self-documenting, menu-driven, very “user-friendly” software.

It responds to your needs—for multiple operating systems on the same disk at the same time, in flexible partitions that grow as needed.

It backs you up—on floppies, using “selective” backup (by date, by volume, by category), so an additional backup device is not needed.

And it has reliability you can count on—combining exclusive use of Seagate drives with Corona's DataGuard™ and FailSafe™.



And the price?

\$1995 for 5 MB,

\$2495 for 10 MB

Experience the difference specialization makes.

Ask your dealer to show you the Corona Personal Hard Disk (or call us for dealership and quantity purchase information).

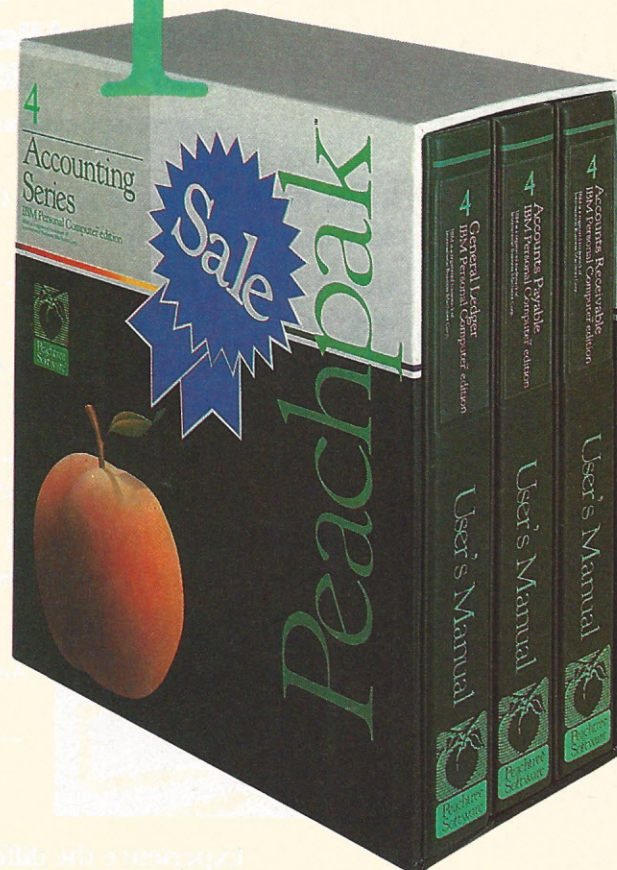
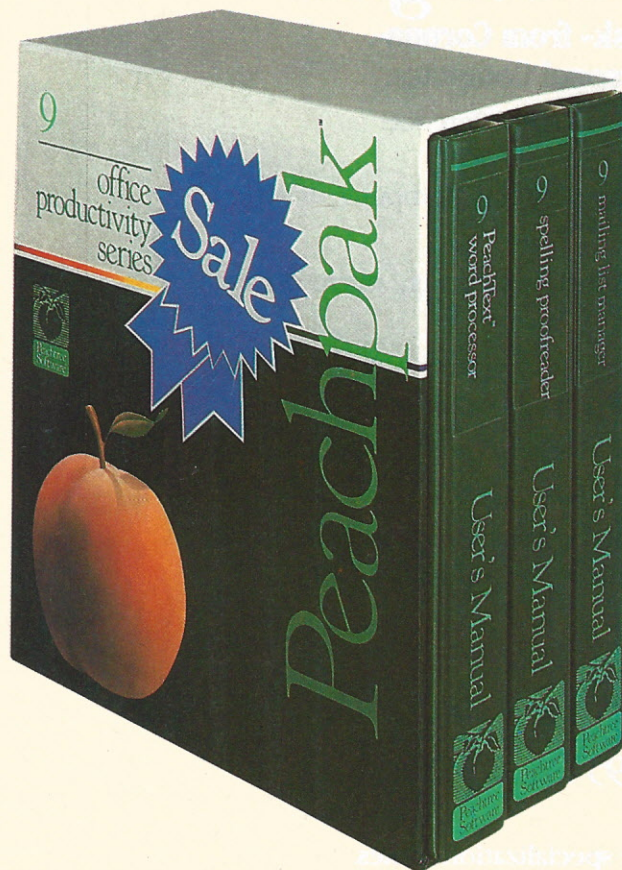


corona

The Third Generation Microcomputer Company

Corona Data Systems 31324 Via Colinas, Section 110, Westlake Village, CA 213-706-1505

Peachpak



Buy One. Get Two Free.

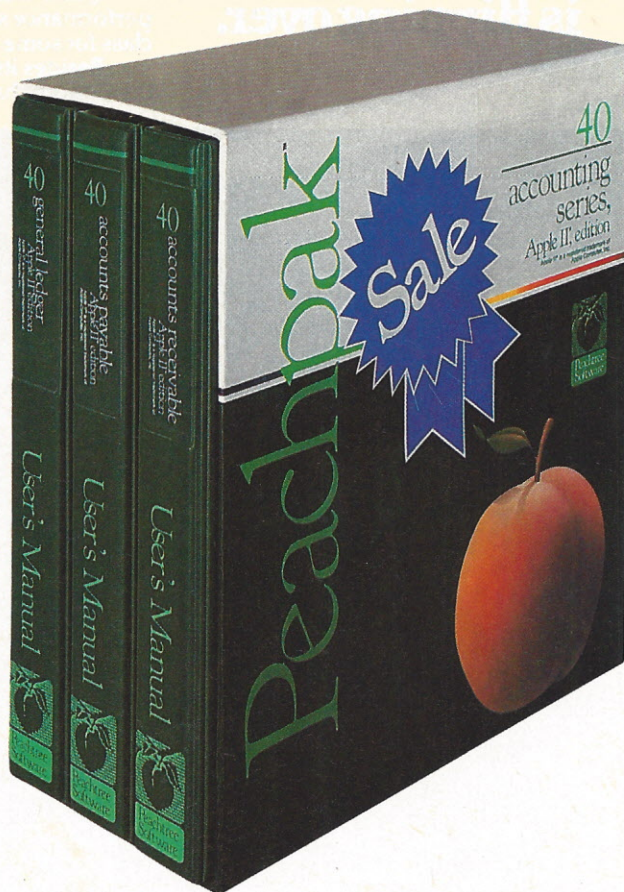
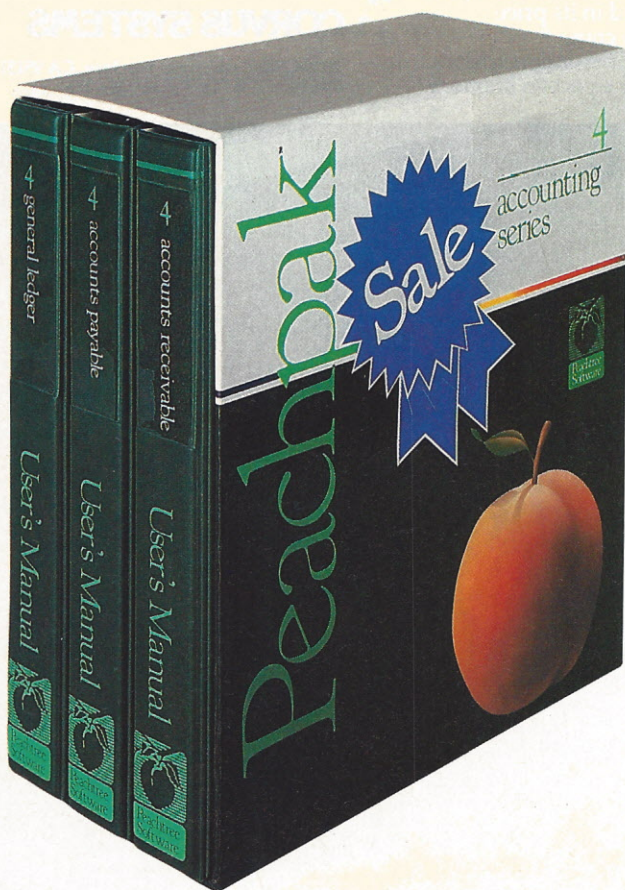
Buy PeachText™ Word Processor for \$500. Get Spelling Proofreader using the Random House™ Dictionary and the Mailing List Manager free. The retail value of this Peachpak is \$1175.

Three for the IBM Personal Computer.™ All for \$595.

Three of Peachtree's Series 4 accounting packages are now available for the IBM Personal Computer. These Peachtree accounting applications serve as an alternative to the BPI product offered by IBM and are designed for businesses that don't require the more advanced accounting features of IBM's Peachtree accounting packages.



Save more than 50% on Peachtree Software.™



Save \$1205. Three Accounting Packages for \$595.

For a limited time, buy General Ledger, Accounts Receivable and Accounts Payable from Peachtree's Series 4 for \$595. The suggested retail value of this Peachpak is \$1800.

Put a Peachpak in your Apple II.™ Three for \$595.

Three accounting packages from Peachtree's special Apple II Series are currently on sale for \$595. This sale price represents a savings of \$605.

(Z80 SoftCard™ and 16K RAMCard™ are required for these packages.)

For further information, contact your nearest participating Peachtree Authorized Software Center displaying the ASC seal or call toll free (800) 554-4600. In Georgia call (404) 239-2045.

Peachpak, Peachtree Software and PeachText are trademarks of Peachtree Software Incorporated, an MSA Company. Random House is a trademark of Random House, Inc. IBM is a trademark of International Business Machines Corp. Apple II is a trademark of Apple Computer Inc. SoftCard and RAMCard are trademarks of Microsoft Consumer Products, Inc.

Please send me further information about the special Peachpak sale.

Name: _____

Company: _____

Address: _____

City: _____ State: _____ Zip: _____

I am a: ☐ prospective dealer ☐ user of software

Peachtree Software Incorporated an MSA company
3445 Peachtree Road, N.E. / 8th Floor / Atlanta, Georgia 30326



Presenting the computer America is flipping over.

Some computers have a vertical format for word processing. Still others offer a horizontal format for spread sheets.

The Corvus Concept™ gives you both. All in a single unit. By simply flipping the screen.

Whole-page word processing and 13-column one-glance forecasting. No need for scrolling. And no need to resort to a printer.

The Seybold Office Systems Report (June 1982) called it "The most impressive new desk-top computer" at the 1982 Hannover Fair. Byte Magazine (June 1982) said "It will set the price/performance standard in its price class for some time to come."

Besides its dual orientation screen, the Concept has set the pace in memory

capacity with 256 thousand bytes (expandable to 512 kilobytes).

And it's designed to grow with your needs. Every Concept has a built-in network interface that transforms it from a powerful stand-alone computer to a versatile, multi-function workstation on an interactive peripheral-sharing network.

Because it was an idea whose time had come, we called it the Corvus Concept.

You'll call it a miracle.

★★
★★ **CORVUS SYSTEMS**

2029 O'Toole Avenue, San Jose, CA 95131
408/946-7700 TWX: 910-338-0226



Good Reasons For Two Kinds Of Data Storage

In this monthly column, "Answers," we will respond to your most frequently asked general questions about personal computing. Please send your questions to: Answers, Personal Computing, 50 Essex St., Rochelle Park, NJ 07662.

Q: I'm thinking of getting a hard disk drive. I hear I'll still need a floppy drive. Why?

A: There are three reasons. One: you need some way to load programs into your computer. Two: you need some way to back up data. Three: you need another drive so you can keep going when your hard disk needs repair.

Loading programs is commonly done from 5¼-inch or 8-inch floppy disks. There are other media on which programs can be stored. New disk formats are coming, for instance, and there are tape cassettes. But most of the software is loaded from disk.

One thing that limits hard-disk implementation is software copy protection. You have to sympathize with software firms trying to protect their products from theft by duplication. But they protect the product so well that you often can't install protected programs onto hard disk. Besides, it may not be legal to do so. So you need to search for unprotected software to use, or put up with booting programs from your floppy disk drive while you wait for the industry to solve the software-piracy problem. A good programmer can help you put a protected program onto hard disk—and as long as you bought the program fair and square and aren't copying it for others to use, you may retain support from the maker. But

you can't count on it. Check before you go the programmer-installation route. Vendor software support is truly mandatory.

As for backing up data, just ask yourself, "What would happen if all my data on this hard disk were lost at any given instant?" The ideal backup is a removable hard disk. Such devices are being made, but they're not available to consumers yet. You can back up a hard disk with another just like the first. But since hard disks used in personal computing are non-removable, you're stuck when you reach the limits of the disks. So you need a different form of backup—tape, floppy or removable hard disk. Since you need a floppy drive anyway for program input, using it for backup is about the simplest solution. The disadvantage is in the number of floppy disks you'll need. If you have an Apple II Plus that runs standard single-density floppy disk drives, for instance, that's 35 floppy disks per hard disk. Other large, high-density disks could need as few as five 8-inch floppies to back up a 5-Mbyte hard disk.

Lastly, you need backup for continuous operations. The hard disks haven't really been around in general use long enough to establish their reliability in personal-computing applications. But, from engineering calculations, they are known to be very reliable—more reliable than are the older removable hard-disk packs or floppy disks. A Winchester disk, which is the kind used for personal computers, is an incredibly precise device, so it makes sense to assume that it will break down at one time or another—undoubtedly just when you

need it most. That floppy drive you didn't want will be invaluable then. Slow go is better than no go at all.

Q: What does it mean to "boot" a computer? And what is the difference between a "warm boot" and a "cold boot"?

A: "Boot" is short for bootstrap. It comes from the old expression, "Pulling yourself up by your bootstraps." To boot is to load the software of your choice into your computer's active memory. You might call it a program-starting program. "Cold" and "warm" refer to whether you start up the program you want with the machine off or on.

An Apple II Plus' bootstrap loader searches for a program to load when you turn the computer on, for instance. It looks for the program in the drive connected to the drive #1 position on the disk-controller card inserted in slot #6. Finding the application program in the drive, the bootstrap program loads it into memory and begins execution. In this case, the system has been booted with a cold boot.

By contrast, suppose the computer is on and you've been working with one program, then quit that program to run another. You put a program-laden diskette into your drive and type PR#6. That command instructs the machine to boot whatever you put in drive #1 on the controller card in slot #6. In that case, the system has been warm booted.

Many other computers, including older Apples, don't automatically try to boot what's in the disk drive when the system is turned on. On an older Apple you might get a screenful of

visual garbage and have to give the machine a two-key command to get it into position to warm boot the program. Depending on the program being booted, another step or two might be required. However many preliminary steps the machine requires, the computer twirls the disk drive and reads the program off the disk and into its active memory. Then it either starts running the program or waits for a run instruction.

Q: I currently have a 64k Inter-tec Superbrain with CP/M version 3.0. I'd like to play some games, but they only seem available for the Apple or Radio Shack computers. Is there any game software available for CP/M users?

A: Yes, but if you want information about how and where to get it, that's another story.

CP/M, as you probably know, is a de-facto standard operating system for small computers, but it has mostly business applications running under it. There are a lot of reasons why this is so—most of them marketing considerations.

Not too many years ago companies offering game software somehow got labeled as hobby-software companies. Those who did this kind of labeling began to equate business software with virtue, and game software with sloth and indolence. So companies that wanted to be thought of as serious began to develop software for business to run under CP/M. Demand for good business software is so great that successful business-software companies often found that that was all they could do. They couldn't have broken out of that and into games even if they wanted to. Although it's a sure bet that programmers in such companies create games for their own amusement, they just don't have the time to develop them for the market.

Companies that do produce game software found something of the same time bind operating on them.

They didn't take the time to develop games for CP/M systems simply because of the demand for games on computers that don't use CP/M. To branch out to CP/M would require their programmers to learn a new operating system. Also, authors who write games on a free-lance basis and then get them published by some software publisher have no incentive to write for a CP/M system, since their programs for other systems readily get published.

Nevertheless, there is game software for CP/M systems. We dimly recall hearing about some several months ago. Unfortunately, a diligent search failed to turn up any relevant information. That's not a satisfactory answer to your question, but we'll keep looking. As we find examples, we'll bring them to your attention. Can anyone out there help?

Q: Lexisoft advertised boilerplate features for its word processor in your magazine. Is this the same thing as a steno key?

A: While we're not really sure what a steno key is, we can explain boilerplate features.

If you have some words, phrases, sentences, etc., that have to appear in many documents, or in many places in the same document, those words, etc., are often called boilerplate. Boilerplate features merely allow the user to deal with boilerplate in a convenient fashion. Usually it can be assigned to a reserved location in a text buffer, and then called and inserted into the document with the use of one or, at worst, a few keystrokes.

Such capabilities are particularly useful for traditional professionals—lawyers, accountants and the like—who produce many documents whose basic nature is identical, but who must customize a particular document for particular clients. These documents can be assembled quickly and easily using boilerplate features.

We should point out that just because a word processor doesn't seem

to handle boilerplate in a convenient fashion, that doesn't mean it won't handle it at all. One thing users find quickly is that many programs can do almost unbelievable things if the user employs enough initiative. Thus you might be able to get boilerplate capability by cleverly merging text files from a disk, for example, and assembling the final document from the merged files.

Q: Your word-processing special report talked about user-definable keys. What are they?

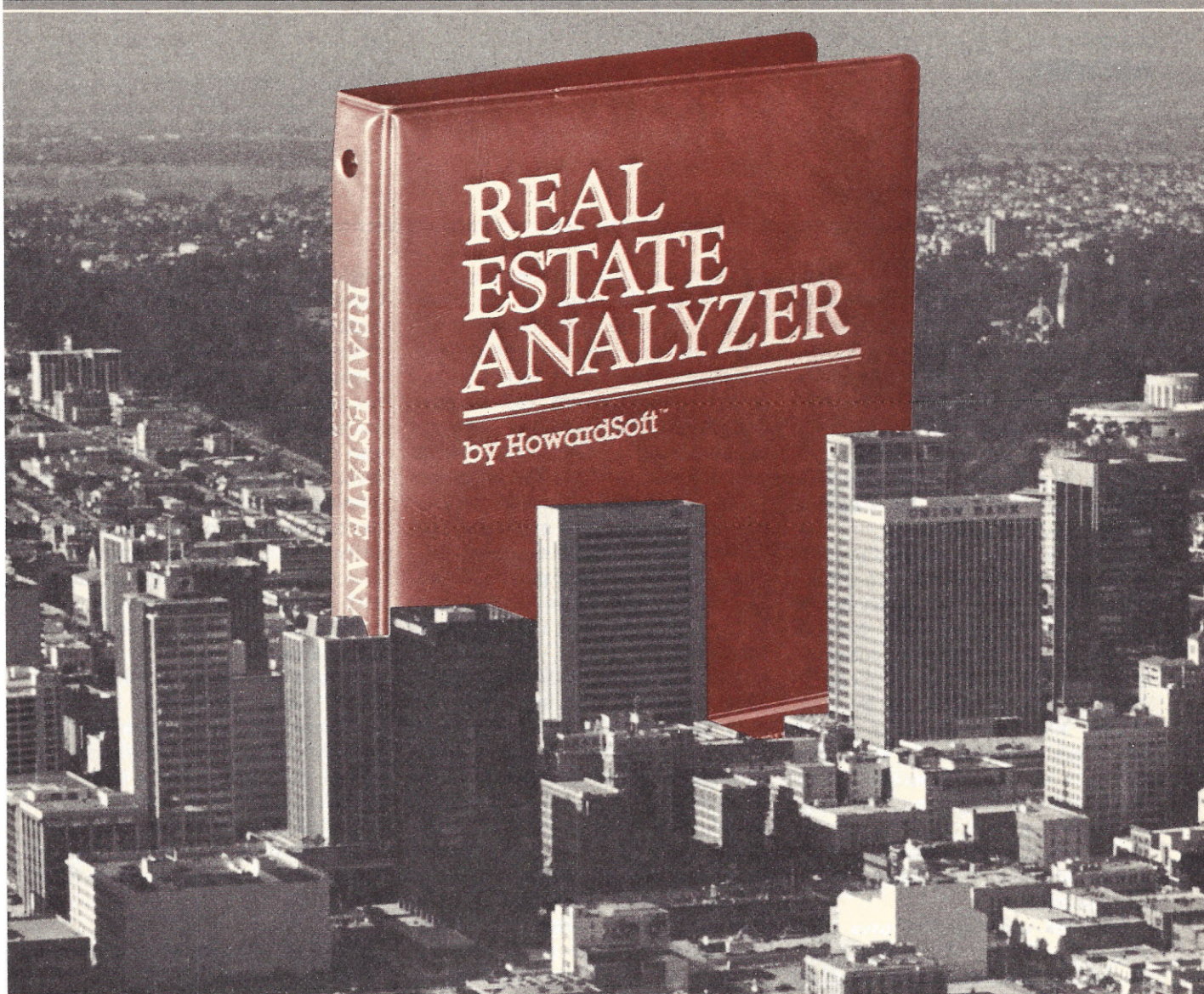
A: User-definable keys can be a lot of things. Generically, a user-definable key is one whose function can change depending on the whim of the user. You might want to have one keystroke provide you with a disk catalog, for example. That function could be defined onto one user-definable key.

These are also called soft keys because the user defining takes place in software, as opposed to hardware. Some computers have separate keys that can be defined, and software to define them resides in those computers' operating systems. The HP-250 is an example of such a machine—its user-definable keys are arranged around the lower edge of the display.

Other computers, like most of the personal computers, have no such separate keys. The fewer the keys, the lower the cost. So if user-programmable keys are to be provided on a personal computer, they have to be defined in the software for keys on the regular keyboard, or else you need to buy an add-on device. Such a device is available from Videx for the Apple II. The Function Strip acts in concert with the Keyboard Enhancer to allow you to define characters, sequences of characters, or commands or sequences thereof, and store them in a buffer, from whence they can be recalled by pushing one key on the function strip. The combination of the two products retails at \$215.

Some software allows you to define

THE BEST STANDS OUT



PRACTICAL DECISION-MAKING

Makes buy/hold/sell decisions by projecting cash flow & profitability; computes ROI, IRR, ROE, and FMRR.

REALISTIC SIMULATIONS

Models economy based on 5 separate components of inflation for realistic "what-if" studies

UP-TO-DATE WITH CURRENT MARKET

Takes into account rent control, runaway inflation, money rates, creative financing, and complex lease packages

UP-TO-DATE WITH TAX LAWS

Includes latest tax laws for depreciation (including CRS), recapture, & capital gains

PROFESSIONAL PRINTOUTS

Detailed 10-year tables of cash flow and ROI in personalized, paginated report format

ERROR TOLERANT

Designed for ease of use by newcomers to computers; fully tested by real estate professionals

INSTRUCTIVE MANUAL

100-page book includes easy-to-follow examples and detailed instruction in investment analysis

The best investment clearly stands out when you use computer-aided decision-making with the Real Estate Analyzer by HowardSoft. Applying the latest techniques in investment analysis, this software produces detailed, objective projections of cash flow and overall investment return for any commercial or residential property. Even the most dissimilar deals are compared fairly because inflation rates, creative loan packages, complex depreciation schedules, involved leases, and complex tax laws are all taken into account.

\$195 AT YOUR DEALER

for the 2nd Edition for Apple Computers.
(Ask about our other tax and financial software.)



Howard Software Services

for the SERIOUS Personal Computer User

8008 Girard Ave. Suite 310 | La Jolla, CA 92037 | (714) 454-0121

function keys. Other software doesn't. There are arguments pro and con about the efficiency of such keys. You're best off to check for yourself and find out if you really need them before you start a search for the ability to define key functions.

Q: My printer comes with a three-foot cable, but I need a longer one. Can I get one?

A: Printers are connected to computers with one of two different kinds of interfaces, either parallel or serial. Connections to parallel interfaces are generally limited to six-foot to ten-foot runs, and can be bought from, or made up by your dealer. You can make your own if you know which wire in the cable connects to which function. Serial connections could go up to 500 feet, depending on how they're routed, and could require some expensive modifications to the printer and/or the computer.

Parallel transmission uses plus five-volt and zero-volt levels to signify the binary numbers (strings of 0s and 1s) that computer systems talk with. That means you have a five-volt difference between the two things you can say, out of which anything you'd want to print is constructed. Serial transmission, using what's known as the RS-232-C protocol, so called by the Electronic Industries Association (EIA), can handle much longer runs because it uses two signals which differ by 50 volts instead of five. So, roughly speaking, serial transmission is 10 times stronger than parallel transmission. That means serial transmission can go farther than parallel transmission.

That's because the lower voltages can't push through a very long cable without becoming attenuated. A parallel design sends signals back and forth through the cable based on a certain timing. Longer runs throw the timing off, causing errors. Information transmissions based on voltage differences are subject to in-

ducted noise that can garble the data. The weaker the signal is, the more subject to noise interference it is. Electronic noise can come from the telephone, fluorescent lights, typewriters, tape recorders, the computer's power supply and other electronic equipment, especially that which contains transformers. The magnetic fields associated with such devices can electrically affect something the device isn't physically touching. It's good practice to route printer cables as far away from these noise sources as possible, whatever the length of the cable.

You can employ cable shielding to keep noise out, and heavier-gauge wire reduces attenuation. But you may have trouble finding a long, shielded, heavy-gauge cable with the connectors you need at each end. A dealer might be able to make you one (often for disheartening sums) embodying a number of these qualities.

Epson, which makes the MX-80 and 100 printers, provides a three-foot shielded cable to connect its printers to industry-standard parallel interface cards. If you want to use one with an RS-232-C port you have to buy a \$150 serial adaptor card, then take a screwdriver and 10 minutes to install it in the Epson, or have the dealer do it.

Another kind of interface, called a current loop, is good for up to a mile. But you'll have a tough time getting one; they're becoming quite rare. They are the Teletype standard.

Q: I've heard that smoking is bad for computers. Is this true?

A: Yes. It hurts their disk drives. Cigarette smoke contains a mixture of gases and ash. Ash can gum up and abrade the read/write heads in the drives and the surfaces of the diskettes, along with the pressure pads that push the disk surface against the read/write head in a floppy drive. That's especially important if you use double-sided diskettes or if you use both sides of your diskettes in

single-sided drives, as you can with Omni Flip/Floppy diskettes. It's especially important with high-density drives with more than 200 kbytes of storage on a 5¼-inch diskette. Just a few ground-in errors could ruin both the diskette and its data. Ash can also coat the printed-circuit boards inside the computer, and sometimes connect two close-together wires that weren't meant to be connected—perhaps with spectacular results. The silicon chips your computer thinks with do badly when overheated, and a thick layer of dust and ash can inhibit the cooling they need.

Smoke contains "particulates," which you can think of as free-form sandpaper where disk drives are concerned. Computer users who smoke should clean their drives often and pay attention to room ventilation.

Sealed disk drives (as are most hard disks) aren't as badly affected by smokers, since the air inside them is filtered.

Q: Can I use my typewriter as a computer printer?

A: Maybe. You can plug it in or plo p it on if your typewriter's keyboard layout looks like an IBM Selectric's. You may be able to install an interface card inside many of the new electronic typewriters (such as those made by Olivetti, Adler, IBM and Olympia), which lets you plug them into an RS-232-C port. With the older electromechanical typewriters it's more of a problem. Kits have been made to convert them in the past, but they all cost upwards of \$600. Since you can now buy a letter-quality printer, like the Smith-Corona TP-1, for a little more, it becomes a questionable purchase. Hollander Office Products of Thousand Oaks, Calif., is now importing the Tyrop—a device that fits over a Selectric-style keyboard and hits the keys with little plungers, one for each key. If your typewriter's keyboard is compatible and \$695 is acceptable,

(continued on page 176)



Turn your Apple into the world's most versatile personal computer.

The SoftCard™ Solution. SoftCard turns your Apple into two computers. A Z-80 and a 6502. By adding a Z-80 microprocessor and CP/M to your Apple, SoftCard turns your Apple into a CP/M based machine. That means you can access the single largest body of microcomputer software in existence. Two computers in one. And, the advantages of both.

Plug and go. The SoftCard system starts with a Z-80 based circuit card. Just plug it into any slot (except 0) of your Apple. No modifications required. SoftCard supports most of your Apple peripherals, and, in 6502-mode, your Apple is still your Apple.

CP/M for your Apple. You get CP/M on disk with the SoftCard package. It's a powerful and simple-to-use operating system. It supports more software than any other microcomputer operating system. And that's the key to the versatility of the SoftCard/Apple.

BASIC included. A powerful tool, BASIC-80 is included in the SoftCard package. Running under CP/M, ANSI Standard BASIC-80 is the most powerful microcomputer BASIC available. It includes extensive disk I/O statements, error trapping, integer variables, 16-digit precision, extensive EDIT commands and string functions, high and low-res Apple graphics, PRINT USING, CHAIN and COMMON, plus many additional commands. And, it's a BASIC you can compile with Microsoft's BASIC Compiler.

More languages. With SoftCard and CP/M, you can add Microsoft's ANSI Standard COBOL, and FORTRAN, or

Basic Compiler and Assembly Language Development System. All, more powerful tools for your Apple.

Seeing is believing. See the SoftCard in operation at your Microsoft or Apple dealer. We think you'll agree that the SoftCard turns your Apple into the world's most versatile personal computer.

Complete information? It's at your dealer's now. Or, we'll send it to you and include a dealer list. Write us. Call us. Or, circle the reader service card number below.

SoftCard is a trademark of Microsoft. Apple II and Apple II Plus are registered trademarks of Apple Computer. Z-80 is a registered trademark of Zilog, Inc. CP/M is a registered trademark of Digital Research, Inc.

MICROSOFT

CONSUMER PRODUCTS

Microsoft Consumer Products, 10700 Northrup Way
Bellevue, WA 98004 (206) 828-8080

Sci-Fi Fans Unite And Beam Aboard Data Base

Hold on to your lasers and phasers. You are about to be beamed aboard Starbase 12 for a mission into the world of science fiction aficionados. Through modern technology (a personal computer and a modem hooked up to your telephone) you are transported through space and time to receive the latest science-fiction news, reviews and trivia, compliments of your captain, Sith Lord.

Sith Lord and Starbase 12 are the creations of Anthony Targonski of Cambridge, Mass. In fact, Targonski *is* Sith Lord and Starbase 12 is an electronic bulletin board that he created on his Atari 800. "I'm not only a major computer fan but a science-fiction fan as well," says Targonski. "I wasn't satisfied with the science-fiction coverage on CompuServe and The Source. I also knew that non-computing science-fiction fans had a very

chines, or respond to the columns and editorials.

Targonski expects a tremendous response to his latest editorial concerning rumors about the *Star Wars* movie series. He explains that the latest *Star Wars* movie, *Revenge of the Jedi*, supposedly the last film of the first trilogy, has just completed filming in Yuma, Ariz. It has been rumored that the next trilogy will start with Darth Vader and Obi-Wan Kanobi as young men. Consequently, all of the cast members that have been so popular with movie-goers up until now will be let go. Because of the popularity of these original cast members, other rumors have been circulated that there is a chance that they will be retained and the original plans will be changed.

"Passengers are invited to give their proverbial 'two cents worth' opinion in the public message section on any of the columns that we have, any of the editorials, any of the news or review columns," says Targonski. "It's their chance to comment on the review that we have, to give their own review of something, to give a bit of science-fiction news that they have, or to respond to some of the things that we are tossing out our opinions on."

Targonski runs the bulletin board out of his home using a multidrive Atari 800 with 48k of RAM. The system is paid for directly out of Targonski's own pocket from revenues he receives from some software he has written for the Atari. There is no charge to users.

The bulletin board program is a hybrid of a variety of data-base management programs that run on the Atari. It is written entirely in BASIC because the bulletin board's support base is not limited to Atari users—they are probably only 10 or 15 percent of the passengers. "We have had everything from people calling on Apples to people calling from mainframes," Targonski says. And the user base is running into the hundreds from all over the country—New England to Hawaii.

The hours of the bulletin board are Monday through Saturday, 5 p.m. to midnight, and Sundays, 2 p.m. to midnight (that's Eastern time). Targonski hopes to have a 24-hour schedule in the near future. To beam aboard Starbase 12 call (617) 876-4885.

THE COMPUTER FRINGE BENEFIT

Chase Econometrics/Interactive Data Corp. recently sponsored a program that allowed its employees to lease or purchase an IBM Personal Computer for about half the retail price. The company, engaged in the imple-



A bona fide science-fiction fan, Anthony Targonski (Sith Lord) awaits another passenger on his bulletin board, Starbase 12.

nice information network in printed matter with things called fanzines (fan-produced magazines), so I came up with the idea of creating a video magazine."

Starbase 12, according to Targonski, is best likened to a science-fiction information service. There are six rotating articles covering the latest science-fiction film and television news, news of the industry in general, commentaries and trivia quizzes. The data base also features an interactive mode in which users, or "passengers," can "talk" to Sith Lord via the keyboards of their own ma-

Imagine

Never having to type the word "CATALOG," or trying to remember how to get from one part of a program to another!

If you could do these functions, and many more like them, at the STROKE of a SINGLE KEY, would you? We thought you would! So, we invented the Enhancer][and the Function Strip. More than just another lower case adapter, the Enhancer][is an intelligent keyboard processor. Now characters, strings of data, commands and statements can all be stored in your Enhancer][for immediate recall by pressing JUST ONE KEY!

Features that you would expect only on larger systems now can be yours. EASILY! For instance, wouldn't you like auto-repeat, and hi-speed repeat? How about a type-ahead buffer? Even user-definable function keys are available for greater input flexibility.

The Videx Enhancer][and Function Strip; it really is the Dawn of a New Era for Apple][™.

Suggested Prices

ENHANCER][149.00
FUNCTION STRIP	79.00
Package Deal	215.00



mentation and operation of decision-support systems, felt that this effort would make its employees more familiar with sophisticated personal computers and their business applications.

The company felt that the program was indicative of the growing trend of using personal computers for management applications, rather than relying on mainframe computers and data processing departments. "Because we're in the computer services industry, it's important that our employees be well-versed in the latest technology," says Carl Wolf, president of the firm. "The better our employees understand personal-computer technology, the better they'll be able to address our clients' needs."

Any employee who purchased a computer outright was reimbursed for about half the system's purchase price. Thus, for a system complete with peripherals such as a printer and monitor, an employee paid about \$3300. The maximum cost to the company was \$5500 for each system. (The list price for the IBM Personal Computer, without peripherals, is \$3615.)

If an employee chose to lease the computer, it cost him approximately \$100 per month, based on a 36-month lease. After that time, he would own the machine.

The employee could choose from a variety of computer configurations, but in addition to the basic computer, the company recommended a modem, a letter-quality printer and a color monitor. Software was also available from MicroSoft of Bellevue, Wash. Some programs including Pascal, FORTRAN, WordStar and SpellStar were also available.

The memo announcing the offer was distributed to the company's employees in May, and sign-up was slated for two weeks later. The computers were gone in about a week, and everyone who wanted a computer got one. The company has not yet decided if it is going to continue the offer to its employees.

NEW CABLE TV LINEUP FOR '83: ARCADE GAMES

Since the introduction of such video games as Pac Man and Space Invaders, Americans have invested millions of dollars in quarters at games arcades. Indeed, some declare, serious tensions result in games addicts who are stuck at home for one reason or another and cannot get to a games arcade. Coming to their rescue in mid-1983 is a new 24-hour video-games channel for cable TV. It will be called The Games Network.

The network is a joint venture of International Cable Casting Inc. and the Westwood Group. For an installation fee of approximately \$40 and \$14 a month, the local cable operator will come to your home and install a cigar box sized microprocessor and a 24-key keypad with options for joysticks and paddles.

Twenty games will be offered each month, which the

user can play for an unlimited time with no more worry that the 90 seconds is almost up. The network will monitor the game playing to determine which games are most popular. The top 15 in the survey will remain on the network for the next month and the bottom five will be replaced with five new games. This adds up to approximately 60 games a year. Subscribers will also receive a magazine describing what the channel is offering that month.

Approximately 300 games have been chosen for the network from companies across the country. Games will cover fantasy, space adventure, role playing, logic, education and other themes.

When cable goes two-way (most systems are now operating one way only), the network will be able to record all



The Games Network, a 24-hour video games channel on cable TV, will offer a variety of games including fantasy, space adventure, role playing and logic.

scores and give away prizes for the highest tally in an area. Users will also be able to play a game with a friend over the telephone lines. "Two-way is the wave of the future," says Jim Summers, director of acquisitions for The Games Network. "The possibilities are limitless."

The Games Network is currently testing its welcome in Fullerton, Calif., where a 90-day trial started September 15. Of 500 homes surveyed for the initial test, 100 are actually participating.

CP/M®

PRICE WAR!

WORDSTAR™
\$249

For IBM/PC

dBASE II™
\$495**SuperCalc™**
\$199**Perfect Writer™**
\$249**CHECK OUT ALL OUR INCREDIBLE BUSINESS CP/M® PRICES.**

	For Apple	For CP/M
MICROPRO™		
WordStar	\$199	\$249 *
Wordstar/MailMerge	\$259	\$309 *
MailMerge	\$ 69	\$ 79 *
CalcStar	\$119	\$199
DataStar	\$169	\$199
SpellStar	\$119	\$169
Supersort	\$119	\$169

PERFECT SOFTWARE™	
Perfect Writer	\$249 *
Perfect Speller	\$129
Perfect Filer	\$189

TCS ACCOUNTING™	
General Ledger	\$ 99
Accounts Payable	\$ 99
Accounts Receivable	\$ 99
Payroll	\$ 99
All four above	\$249
Inventory Management	\$ 99
TRSDOS	
Accounting Package	\$199

ASHTON-TATE™	
dBASE II	\$495 *
SORCIM™	
SuperCalc	\$199 *

SPELLGUARD™	\$179 *
SMARTERM™	\$ 49
IUST™	
Easywriter II	\$269 **
Easyspeller	\$139 **
CBASIC™	\$ 99
SELECT™	
"The Word Processor"	\$395
MICROSOFT™	
Softcard	\$289
Videoterm (Videx™)	\$279

Ram Card	\$169
All three above	\$579
MBASIC	\$279

FOX AND GELLER™	
Quickcode	\$239
CONDOR I™ (Data Base)	\$209
THE WORD PLUS™	\$129

* These programs are also
available for IBM®/PC.

** Only for IBM®/PC.

Price includes manuals.

THE 800-SOFTWARE PROMISE.

We are dedicated to providing the finest software at the lowest possible price. Plus the personal service you expect and deserve.

Count on us for:

- ☐ The lowest prices anywhere. High volume selling makes it possible.
- ☐ Fast delivery. We process every order the same day we get it.
- ☐ Giant inventory. Everything's in stock so you don't have to wait.
- ☐ Technical support. We back up what we sell.
- ☐ Specialist expertise. We are the business CP/M® software experts and can serve you better. Let us prove it.

**TO ORDER, CALL TOLL-FREE:
800-227-4587**

In California 800-622-0678
CA residents add sales tax.

OR WRITE:**800-SOFTWARE, INC.**

185 Berry Street, Suite 6820, San Francisco, CA 94107

- ☐ Purchase orders accepted.
- ☐ Prompt UPS 3 day Blue Label service.
- ☐ Call for shipping charges.



800-SOFTWARE

Network officials have established that an interest in the service exists. Surveys by Cable Marketing in different cities across the country have shown a low interest ratio of 24 percent and a high ratio of 60 percent. These figures are exciting to cable operators because the people surveyed are currently not on any type of cable service but are in areas where cable is available.

"Because of the response we are currently getting from the major cable companies, as well as the smaller ones, we feel very confident that the service will be readily accepted," says Summers. "It is a nice way to increase their subscriber base."

Companies tentatively scheduled for the Fullerton test are: Datamost Software, Chatsworth, Calif.; Sentient, Aspen, Colo.; Avante Garde Creations, Eugene, Ore.; Phoenix Software, Lake Zurich, Ill.; Hayden Software, Lowell, Mass.; Edutek, Palo Alto, Calif.; Broderbund Software, San Rafael, Calif.; Cavalier Computers, Del Mar, Calif.; Computer Programs Unlimited, Everett, Wash.; and Innovative Design Software, Las Cruces, N.M.

Down the line, ICCI is planning to offer other cable channels, including the IQ Channel and the Adventure Channel.

For more information on the Games Network contact International Cable Casting Inc., 937 Lucerne, Los Angeles, CA 90005.

GREYHOUND PUTS A COMPUTER IN THE DRIVER'S SEAT

When the Greyhound bus station in Santa Ana, Calif., put a new station agent in its corporate driver's seat, customer service improved, ticket sales almost doubled in one month, and overhead operating costs were reduced. The agent, Ernie Gonzalez, attributes part of his success to an Altos ACS/8000 computer and software developed specifically for the busing industry.

"When I took over the agency in January 1981, I was willing to leave the driving to the bus drivers," says Gonzalez. "But I wasn't willing to leave fares and scheduling in the hands of operators who were being swamped with as many as 1000 phone calls a day. I decided that a computer system would not only improve service, but would create a more pleasant working situation for employees."

Gonzalez found that making the decision to buy a computer to solve his problems and actually selecting a computer and the software to do the job were two totally different things. "I was overwhelmed by what was available on the market," he says. "Then I received a letter from a fellow agent located in Florida."

This Florida agent, Jim Austin, had worked with Threshold Software to develop BUSS, a two-part software package. The first part provides scheduling and

pricing capabilities, while the second part provides a bookkeeping system.

Gonzalez had the solution to his problem. He ordered the computer and the software, which were both installed in his agency in late July 1981.

Before it got the computer, the bus station employed two full-time operators to handle up to 1000 route and fare information requests per day during the summer, and between 400 and 600 calls during the winter. Each call averaged five to six minutes, and customers would frequently tire of holding, hang up, and call a competitor. It was this situation that Gonzalez hoped to remedy.

"By having our scheduling and pricing information on line, we reduced the length of the average phone call to approximately one minute," Gonzalez says. "This means



Greyhound station agent Ernie Gonzales makes fare changes at the terminal of his Altos computer. The computer has reduced this task from three hours to five minutes.

that we can handle a greater volume of calls, and customers aren't left on hold. Therefore, our actual ticket sales increase." Also, only one operator is now necessary, even during the peak calling season in the summer.

Gonzalez figures that the computer system costs approximately \$17 a day to run. "I couldn't hire a part-time employee for that," he says. "And it is also a tax write-off. The cost is justified, no matter how you look at it."

His system consists of an Altos ACS/8000-10 computer with 208k of memory and a 10-Mbyte Winchester hard disk drive. Two of his three terminals are currently in use. One is located at the ticket counter and the other is in the information room. The third terminal will be used for the bookkeeping part of the system.

Because most of Gonzalez's business is within the state of California, 95 percent of the data base is concerned only with California fares and scheduling, while the remaining 5 percent is dedicated to the rest of the United States.

If a customer requests route and fare information to San Francisco, the operator simply types "San Francisco"

NO WAITING



Now, with Microfazer you can compute while you print.

Time is money. You own a computer system because you know that it can save you money by simplifying office procedures and reducing the time involved in payrolls, accounting, word processing and those other wonderful things we all must do. Time is an important resource which should not be wasted. Even though your system seems efficient, you could be wasting valuable time if you ever wait for your printer to finish printing before more information can be entered into your computer.

NO WAITING. Now with Microfazer by Quadram there will be no more waiting.

The Microfazer is an inexpensive universal printer/buffer that can be used with all popular micro-computers and parallel printers. Microfazer receives information from the

computer at up to 4000 characters per second (your computer thinks the printer is printing this fast), holds it until your printer can handle it, and then sends it on to the printer. Controlled by a custom LSI, Microfazer uses standard centronics signals and is powered by the printer or an inexpensive external AC adapter. Buffering of 8K, 16K, 32K or 64K is available.

EASY INSTALLATION. The Microfazer is in a small case (3.5" x 7" x 1"). It is engineered to be plugged directly into the input port of the Epson and other similar printers. Installation can be completed in less than 60 seconds. How's that for not wasting time! Most other centronics compatible printers can be attached by using an adapter cable.

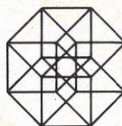
FLEXIBLE. If you should purchase a faster printer later, just unplug and add to your new printer. Changing Computers? Microfazer is not computer dependent. Want to add more buffer? No problem. Microfazer is

user-expandable up to 64K. No other buffers come close in flexibility.

LOW PRICE. Only \$159 for 8K buffer, \$199 (16K), \$225 (32K) and \$299 for full 64K. Serial-to-Parallel and Serial-to-Serial versions are available at slightly higher prices.

QUADRAM QUALITY. The Microfazer was designed with performance and reliability in mind. With a one year warranty, you get Quadram Quality at a surprisingly low price.

ASK YOUR DEALER. If you are currently wasting time waiting on your printer, see your local personal computer dealer. If your dealer is not currently stocking Quadram products, have them call us at (404) 923-6666.



QUADRAM
CORPORATION

4357 Park Drive/Norcross, Ga. 30093

on the keyboard. Five possible departure times then appear on the monitor, each listing the date, departure time, transfer points and arrival time. If none of these are suitable to the customer, the operator calls additional departures in segments of five, by pressing a single key, until an acceptable date and time have been found. After the fare appears, the operator presses the "P" key and the schedule is printed out for the customer.

Gonzalez also uses the computer to make changes in fares. In-state and out-of-state prices are treated separately because percentage increases in fares differ. This allows the percentage to be changed on a single pass of the data base. The process of changing a fare used to take almost three hours; with the computer it takes about five minutes.

"I sign onto the system, and the computer asks what percentage the change will be and if it is an increase or decrease," Gonzalez says. "Once I have entered the response all fares are automatically changed by the percentage indicated, and a printout is issued listing the new fares. I'm really pleased with the whole system."

CATTLE BREEDER HAS NO BEEF WITH PERSONAL COMPUTER

With the help of a Vector Graphic System B computer, Richard and Jane Judy are helping to accelerate the changeover to leaner, less costly meats for consumers. The Judys, the fourth generation to run the family's 5000-acre cattle ranch near Mankato, Kan., are seed stock breeders who raise bulls and cows that will be sold to other ranchers to improve the caliber of their herds.

Until a few years ago, Angus, Shorthorn and Hereford cattle grazed on prairie ranches. When steers were more than a year old, they entered feedlots where, for another five months, they turned corn into layers of heavily mar-

bled beef. Then came all the concern about cholesterol and heart disease, leading the diet-conscious American housewife to change her family's eating habits. She began searching for the kind of lean beef once discriminated against. In addition, tighter family budgets produced a demand for a less expensive beef.

In 1975, a time when the demand for leaner and less expensive beef was strongly felt by ranchers, the Judys gave up lucrative Toronto careers to run the family ranch. The family, along with Richard's father, Bradley, were among the pioneers in the cattle business with the Simmental, a new breed of cattle known for its lean meat, which was brought to the United States from Switzerland.

Without the aid of their computer, the Judys say that they could not manage the enormous record-keeping required by their company, BGR Simmentals. They also use the machine for a variety of purposes including maintenance of the herd record system, correspondence, production of marketing bulletins and financial management. And after 5 p.m., it also helps the Judy children do their homework.

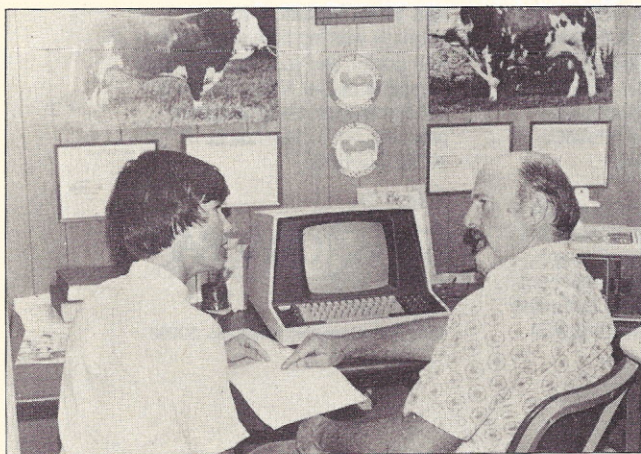
"We looked hard at a lot of computer systems," Richard Judy says of his search for the right system to handle his business. "The Vector System B offered the memory capacity we needed—48k, plus 630k disk storage. It also has powerful BASIC software and a Z80 microprocessor." Reliability was also an important factor since the Judy ranch is more than four hours from the nearest city with major computer service facilities.

The Judys have a major advantage over most ranchers when it comes to selecting a computer. Richard has a doctorate in economics from Harvard University and 11 years as a professor of computer science at the University of Toronto. Jane has a master's degree in public administration from Syracuse University and was a systems analyst for Systems Research Group of Toronto.

The Judys maintain elaborate records of their Simmentals with The Herdsman, a software program they wrote themselves. The records include details of the pedigree, vital statistics, breeding in past years, length of gestation and calving ease, as well as the weights of all calves at birth, at weaning, and at one year of age. Since most of the breeding is done by artificial insemination, the records also show how many times each cow required breeding before conception.

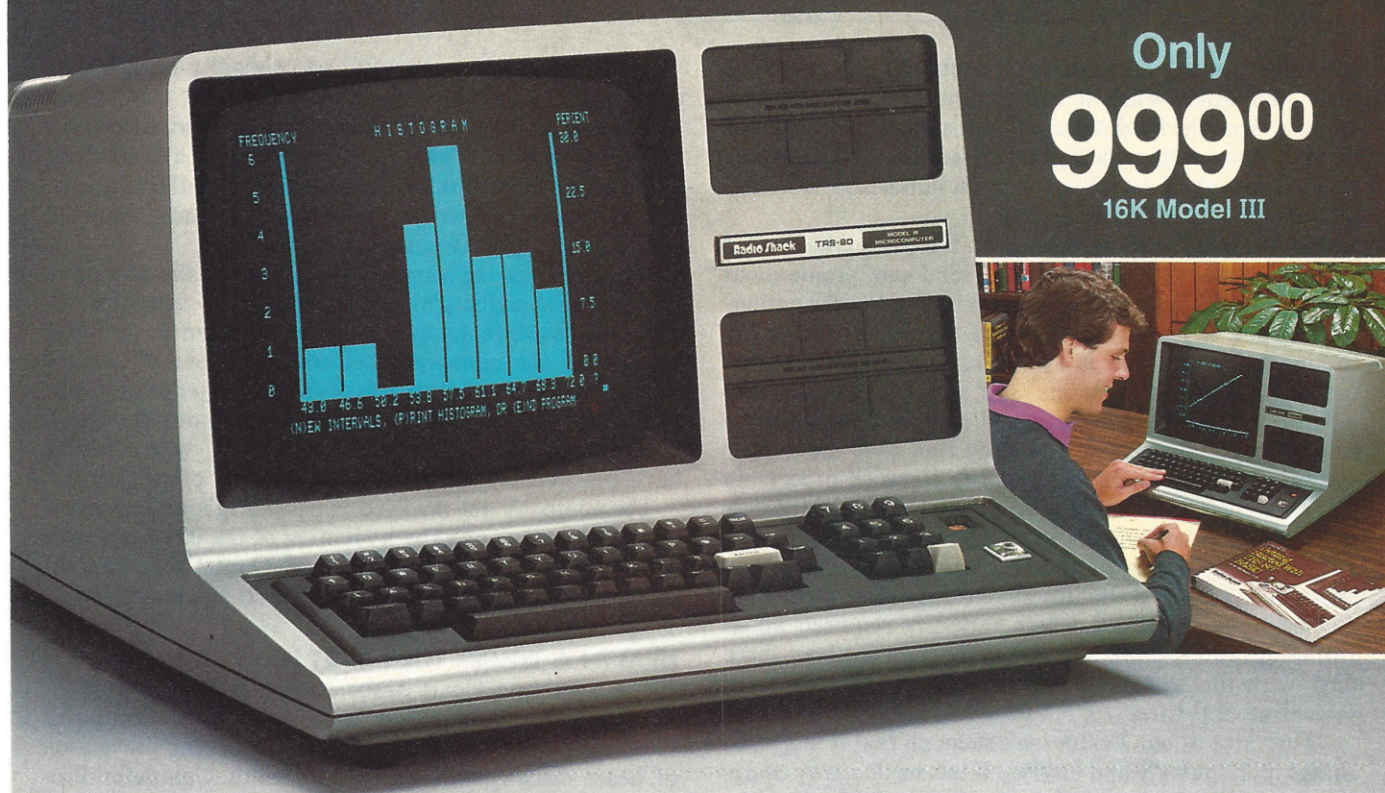
Superior cows will be able to produce calves annually, and raise a calf that in six months will reach a weaning weight of nearly half that of its mother. Calves like this, after a short time on a finishing ration, are ready to become steak. This provides the consumer with leaner and less expensive beef.

While other seed stock breeders keep similar records manually, it is nearly impossible, the Judys believe, to



Richard and Jane Judy maintain elaborate records of their cattle herds with their Vector Graphic System B computer. They also use the system for word processing and accounting.

Start Computing With an Affordable Radio Shack TRS-80® Model III



Only
999⁰⁰
16K Model III

The Complete Personal Computer That's Hard to Outgrow

The versatile and powerful TRS-80 Model III is ideal for beginning enthusiasts because it has big computer features at a remarkably affordable price—and it grows with you as your needs and expertise increase.

No Experience Necessary. You don't have to be a computer expert—just add an optional recorder and use our ready-to-run cassette software for everything from exciting games to word processing to statistical analysis. Our entertaining, step-by-step manual is included and makes BASIC programming easy to learn.

The Extras Are "Built-In." The attractive one piece cabinet contains a 12" high-resolution monitor, which displays 64 upper and lower case characters, a 65-key typewriter keyboard with datapad, and parallel printer interface.

That's Not All. You get 16K internal memory, Model III BASIC language, 500 and 1500 baud cassette operation, repeating keys, special graphics characters, program editor and real-time clock.

Expand Your Horizons. You can add up to 32K more internal memory, and one or two internal double-density disk drives (and up to two more externally). Add a printer or plotter for professional hardcopy output or an RS-232C serial board and modem for communications.

A TRS-80 To Meet Every Need. If you're ready now, complete Model III disk systems start as low as \$1849.

It's Available Now. See the 16K Model III at a Radio Shack Computer Center, store or participating dealer. Stop by today and pick up your free copy of our new 1983 TRS-80 Computer Catalog—or use the coupon.

Radio Shack®
The biggest name in little computers™
A DIVISION OF TANDY CORPORATION

Send me your free TRS-80 Computer Catalog today!

Mail To: Radio Shack, Dept. 83-A-423
300 One Tandy Center, Fort Worth, Texas 76102/2

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Retail prices may vary at individual stores and dealers.

OUTLOOK

maintain as much detail on each animal as they can with their computer. When it comes time to select the best animals from the herd, the computer sorts the records and chooses those that rank highest in key categories, eliminating the task of searching through hundreds of written records for this information.

In addition to keeping records on the cattle, the Vector Graphic system helps the Judys send out promotional mailings for a sideline of their main business—the nationwide selling of semen from some of the finest bulls of the Simmental breed. This is a large-scale operation, mainly based on personal contacts and old friendships. Previously, the family rented an IBM mag-card machine for this correspondence, but now they find that the Vector system and the company's Memorite III word-processing software costs substantially less than the mag-card system and provides a much wider variety of functions.

The financial side of the business is Jane Judy's responsibility. She estimates that transaction processing and cash-flow analysis, which formerly required about two weeks each month, are now completed in about three days with the System B and accounting software from Peachtree Software.

"The value of our Vector isn't so much that it lets us do things more quickly and easily—it lets us do many things that we couldn't do at all before," says Richard Judy. "We can't make cattle breed any faster, but we can breed them better. Most of us in this business think that we can pick out good animals just by their looks, and we're probably right about half of the time. But that's far from good enough. The computer can tell us things about our animals that we'd never know in a lifetime—theirs or ours."

COMPUTER STARS IN E.T.

The box office smash *E.T.*, from director/producer Steven Spielberg, not only stars a little alien creature, but a computer system from Qantel Business Computers of Hayward, Calif. The computer, a Qantel System 355, was called in to play a major role in the government's unsuccessful effort to help the gravely ill space traveler.

Interfacing with various medical instruments in its scenes, the computer kept track of all of *E.T.*'s and Elliot's (the alien's telekinetic friend) vital signs and graphically illustrated how the creature's responses were mirrored by the boy. Spielberg used extremely tight close-ups of the Qantel CRT screen to show how the progress of the two was carefully graphed and monitored by the computer. The machine contributed heavily to a key scene when Elliot began to recover as *E.T.*'s vital signs declined, indicating that the two were again separate beings and no longer shared the same emotions and physical symptoms.

To provide for these graphics effects, programming experts at Qantel redesigned an old game program called

"Snake" which the company had originally modified to demonstrate the graphics capabilities of its computers. "Since we didn't know in advance what special effects would be required," says David Freedman, a marketing applications specialist at Qantel who wrote the program for the movie, "we wrote a program that would allow us to put anything we wanted on the screen."

Another trick the company used to make the computer conform to Spielberg's filming needs was to make the program sensitive to a control signal from a terminal located off the immediate set and, thus, out of camera range. This allowed close-ups of the computer monitoring the changes in the patients' conditions without showing a person's hands controlling the keyboard, which would have interfered with the dramatic effect of the scene.

The company got involved in Spielberg's project when they were approached by a member of the director's production team who had worked with Qantel personnel on other projects, including the *Get Smart* television series.

HEALTH IS WHERE THE HEART IS

The American Heart Association's Greater Boston Division, in conjunction with Classroom Computer News, is taking an electronic approach to the prevention of heart disease with a "Heart Health Computer Programming Contest." The contest is designed to solicit the development of personal-computer programs to educate young people about the importance of good health habits early in life. The programs—for elementary, junior high and high school students—should stress the many ways that heart disease can be prevented.

According to the Heart Association, prevention is the key in the treatment of heart disease, and lifestyle changes and early lifestyle intervention must be stressed to young people. Thus, the association advocates three basic areas of program content: no smoking; aerobic exercise which includes running, jogging, brisk walking and swimming; and a healthy diet which includes low cholesterol, low fat and low salt foods.

In addition to no smoking, exercise and diet, other program topic areas that the group would like to see are: anatomy and physiology, including blood pressure (for all educational levels); stroke, heart attack and high blood pressure (more appropriate for junior and senior high school students); and lifestyle, life expectancy and high-risk factors. The group would also like to see programs that emphasize user interaction with the software, either in a group or on an individual basis.

The focus on computers and their effectiveness in the schools stems from the many recent cutbacks in funding for schools and their programs. Because money is tight in the school systems, health education is one of the first programs to be terminated, but purchases of personal computers have not declined. The Heart Association felt

NEC's new letter-quality printer gets personal with IBM.

The Spinwriter™ 3550 lets the IBM PC get down to business.

NEC's new Spinwriter letter-quality printer is the *only* one plug-compatible with the IBM Personal Computer. So you get the business applications you've been wishing for. Letter-quality output for word and data processing. Multi-language, scientific, and technical printing. Simple forms handling. Quiet operation. And the reliability of the industry's most popular printer line.

NEC designed the new Spinwriter especially for the IBM PC. It comes complete with documentation and training materials to fit your PC user's handbook. Just plug the Spinwriter in and your PC instantly becomes more versatile and flexible.

More than 8 forms handlers and 10 print thimbles boost PC versatility.

NEC designed the Spinwriter's 8 modular forms handlers to accommodate a wide range of paper and document sizes and types. The easily mounted handlers let your computer print out the forms you

need for data processing, word processing, graphics, accounting or other business applications.

The Spinwriter's 50 print thimbles can more than triple your PC's usefulness. They come in both constant pitch and proportional-spaced fonts, plus in foreign language, technical and scientific versions. They snap in and out in seconds, and let you print up to 203 columns on 16-inch paper. They each last for more than 30 million impressions.

This printer's special features make everything look better on paper.

The Spinwriter's software-invoked features include automatic proportional spacing; bidirectional, bold and shadow printing; justification; centering; under-scoring; and sub/super scripting, all at speeds up to 350 words per minute.

That big extra, Spinwriter reliability.

Spinwriters have the industry's best mean-time-between-failure rating, in excess of 3,000 hours. In terms of average personal computer usage, that's more than five years.

The Spinwriter 3550 is available at **ComputerLand** stores, **Sears Business Systems Centers** and **IBM Product Centers** nationwide.

NEC Information Systems, Inc.
5 Militia Drive, Lexington, MA 02173

Send me more information on the Spinwriter 3550.

Name _____

Title _____ Telephone _____

Company _____

Address _____

City _____ State _____ Zip _____
PLC 1082

NEC

NEC Information Systems, Inc.

Spinwriter is a trademark of Nippon Electric Co., Ltd.

We're Made

for Each Other.





**In an age when new standards are constantly emerging,
one disk consistently meets or exceeds them all.**

Maxell. The Gold Standard.

Not all disks are created equal. Some are better than others. To find out what's best for you, look for Maxell disks. They now carry the Gold Standard symbol of quality. It's your assurance Maxell disks meet or exceed every definition of quality. No matter who establishes it. We've earned this universal superiority by never relaxing our uniquely demanding quality control. Every aspect of manufacturing is checked, then checked again.

Your benefits are many. Take the perpetual problem of drop-outs. A drop-out is a tiny defect that wastes time and degrades computer accuracy and performance. Now that you understand what a drop-out is, forget it. Maxell disks don't have any. Each disk comes to you certified

drop-out free at the time of manufacture. You can depend on this quality protecting your valuable programs and programming time, indefinitely. We've run disks over ten million passes under conditions designed to find weak points and wear. We couldn't. And you won't.

There is a Maxell disk for the floppy system you use, or plan to use. Check your computer's instructions. Or write for our complete, highly informative brochure.

When you set the Gold Standard as your level of quality, you'll benefit from improved disk performance, immediately. Bank on it.



maxell®

Maxell Computer Products Division, 60 Oxford Drive, Moonachie, N.J. 07074, 201-440-8020

OUTLOOK

that it needed another way to teach children about heart health, so it decided that working with computers and software was the most effective way to accomplish its objectives.

The programming contest is open to everyone. Although the programs will ultimately be used in the schools for the benefit of students, aspiring programmers will also benefit from the contest; to write programs, they will be forced to think about the causes of heart disease and logical ways to prevent it.

The best program entry will receive \$1500; 11 other entries will each receive \$500. Programs should be written in BASIC to run on the Apple, Atari, TRS-80, Texas Instruments or Commodore PET personal computers. All entries must be received by January 31, 1983. A panel of computer and education experts will serve as judges, and plan to reach a decision by the spring of 1983.

The programs will initially be tested and distributed in the Massachusetts area; they will then be made available nationwide through the Heart Association, headquartered in Dallas, Texas. The Greater Boston Division is currently putting together a package of risk factors to aid in the development of the programs.

For more information on the contest and what the association hopes to accomplish, please contact the American Heart Association, Greater Boston Division, 33 Fourth Ave., Needham, MA 02194, before December 1, 1982.

DOWN TO EARTH TIPS ON GARDENING

Confused about when to plant your next crop of tomatoes? Do you know which is the best fertilizer to use on problem soil? Which are the right tools to use when tilling rocky soil? All of these questions can be answered when you log on to Victory Garden, CompuServe Information Service's new information provider.

Victory Garden is a collection of articles designed to aid the novice or expert gardener in such areas as soil preparation, seed choices, planning, planting and harvesting. There are eight major topics from which to choose: an introduction to the information contained on the new data base; starting a garden, which deals with soil, tools, planting, and preparing for planting; caring for a garden; individual crops; selected topics, including herb and organic gardens; troubleshooting typical gardening problems; a gardener's almanac, which contains articles on the best time to start planting which crops in your particular area of the country, the pros and cons of using a power tiller, and pH testing of soil; and an interactive question and answer section in which the user can electronically mail inquiries to the founder of the data base who will answer through the subscriber's mail box on CompuServe.

The data base also features sections on what tools to use and where to find them, how to go about spacing and

choosing your crops, and what diseases to watch for with certain plants at different times of the planting season. And, at the end of the articles, there are quizzes designed for fun as well as education.

The Victory Garden data base is a creation of Ted Batutis, a member of the agricultural department of Cornell University. He writes tutorials in the area of agricultural economics for instructional and commercial use.

For more information on the Victory Garden and CompuServe Information Service, contact CompuServe Inc., 5000 Arlington Centre Blvd., Columbus, OH 43220; (614) 457-8600.

COMPUTER COMPANY ORCHESTRATES GIFT TO LOCAL SYMPHONY

As the Oakland Symphony Orchestra tunes up for its 49th season under the musical direction of Calvin Simmons, an unconventional instrument will be orchestrating administrative tasks off-stage—a Decision 1 computer donated by Morrow Designs of Richmond, Calif. The symphony management will use the computer for payroll, forecasting and word processing, primarily in the management of its subscription lists and for the recording of ticket sales to help in their marketing effort.

Morrow Designs' top-of-the-line Decision 1 features 65k RAM, a 10-Mbyte hard disk drive, an 8-inch floppy disk drive and software packages including the CP/M operating system, BASIC 80, CalcStar and WordStar. The system has a retail price of \$8000.

"This gift will contribute substantially to the success and effectiveness of our office operation," says Oakland Symphony general manager Arthur Jacobus, "and will help us in working to maintain our high musical standards and continue the educational programs so valuable to the community."

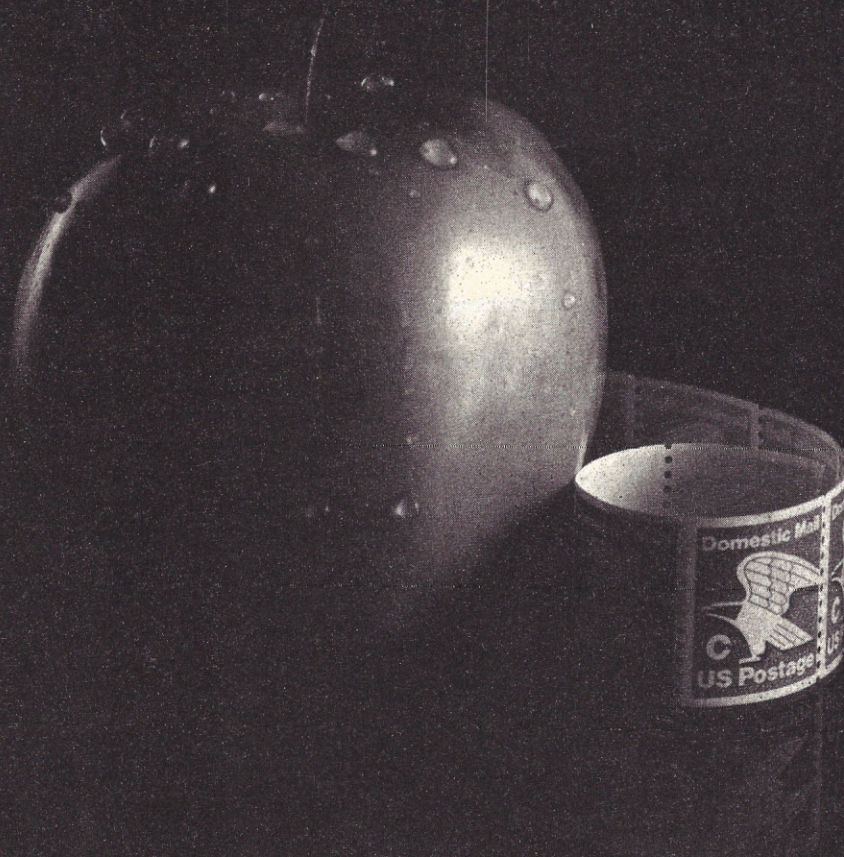
WEATHERING THE ECONOMIC STORM

C. Jim Rice, president and founder of Balanced Investment Planning Inc. of Marietta, Ga., is clearly a leader in the field of financial planning and life insurance, as his membership in the highly exclusive Million Dollar Roundtable (an honorary club for people who sell \$1 million worth of insurance coverage) attests.

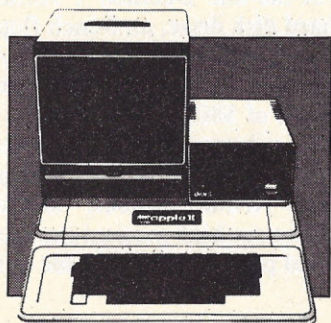
But with inflation and high interest rates threatening to cut into his commissions, he's developed a sophisticated financial software package for the personal computer that is enabling him to weather the economic storm.

Rice's clients are primarily owners of closely held corporations, and his success has been a result of the thorough job he does in showing them how they can use their corporations to maximum tax advantage.

A complete financial analysis used to take Rice 40 to 60 hours to prepare. "I would do it partly manually and partly using Computone, one of the best automated



Now your AppleTM can deliver the mail



THE SOURCESM
AMERICA'S INFORMATION UTILITY

The Source and SourceMail are servicemarks of Source Telecomputing Corporation, a subsidiary of The Reader's Digest Association, Inc.

Apple is a trademark of Apple Computer, Inc.

SourceMailSM makes your Apple computer into an electronic mail box, letting you establish a network and send messages to business associates, customers, or suppliers who are subscribers to THE SOURCESM... around the world.

Put an end to "telephone tag" and the frustrating run-around of being told "I'm sorry, he's out," or "he's in a meeting." Best of all SourceMail can be faster and cheaper than long distance phone calls, Telex, facsimile, express mail, or messenger.

THE SOURCE. Electronic mail and hundreds of other services for your Apple... or virtually any personal computer, terminal, or communicating word processor.

FIND OUT MORE.

Call 800-323-1718 TOLL FREE (in Illinois, call 800-924-8881) and ask Operator #92 for the authorized dealer nearest you. Or write THE SOURCE, Dept. PC982, 1616 Anderson Road, McLean, Virginia 22102 for our FREE information kit.

OUTLOOK

financial planning systems," Rice says. "With Computone, we would have a terminal in our office hooked up to their mainframe. The problem with the set up was that it was so fragmented. It would take me up to 60 runs for just one analysis."

That was before he purchased a Wang 2200 personal computer and created the software company, Rice Systems Inc., to produce a financial planning/life insurance software package. "All the available packages were so incomplete," Rice complains, "so I decided to develop a system that could accomplish everything. And since I was spending so much money on development, I decided to sell the system to other agents as well to recoup my expenses."

Rice Systems used Rice's knowledge and experience as well as a team of lawyers, accountants, programmers and even a psychologist to write the program. The objective of the package is to maintain a high level of client service while freeing up more of the agent's time for actual selling. In fact, the 40 to 60 hours that it used to take to prepare a financial report has been trimmed to one to two hours.

Rice bought his Wang personal computer in January of 1981. One year later his company had completed initial development of the program that Rice feels will revolutionize the selling of life insurance and financial planning.

By June of this year the system was marketed. Six have already been sold. The agent/customer can purchase it in one of two ways: He can lease it for 20 years for \$79,000, plus \$7900 a year for updates; or he can pay \$4000 plus 50 cents for every page the program produces, a figure which Rice monitors through a modem installed in the customer's computer.

The financial planning section, the heart of the program, works this way: The client is asked to complete a special 51-page fact-finding questionnaire that focuses on all aspects of his financial situation: his assets, liabilities, goals, wills, trusts, etc. The questionnaire typically requires about an hour and a half to complete. The information is then keyed into the Wang where it is automatically assembled into a client data file that can be accessed by the agent in preparing a living or estate tax plan.

The computerized system has been designed so a client can achieve his long-term personal and business financial goals—and save significant tax dollars in the process.

"Take the case of an individual with an annual income of \$130,000 and five children whom he wants eventually to put through college," explains Rice. "We can tell him how much to invest today in a lump sum or annual investments to pay for each child's education at various interest rates. The computer automatically performs the calculations on the various alternative investment approaches—insurance, trusts, income-splitting, etc.—and lists the trade-offs as they relate to that individual's particular situation."

The client then receives a 50-page report summarizing his personal plan. "The cost of this service from a tax attorney," Rice claims, "would be \$3000 to \$5000. I charge only \$1000. A Honolulu agency to which I sold this system charges \$950. Since the agency pays 50 cents a page for the 50-page report, their profit on about two hours of work is \$925."

The system is designed to do more than financial planning; it is a complete office management program. For instance, when an agent receives an application for insurance, the information is keyed into the computer. The program determines if doctors have to be contacted for medical histories. If so, a letter is printed automatically. And if in a period of time there is no response, a follow-up letter is then printed. The program can even produce a psychological profile of the client to help the agent complete his sale. It will also do commission statements, direct mail and routine office duties.

RESEARCH TO PROBE SHARING OF COMPUTER POWER

Is networking the future of personal computing? Research is planned at the University of Wisconsin at Madison to answer that question.

Edouard J. Desautels, one of five computer-science professors who will do the research, says, "This system is what personal computers are going to be like in a few years." The system comprises \$150,000 worth of equipment connected into a computer network, and computer programs donated by Hewlett-Packard.

The researchers are trying to determine how personal computers can be interconnected to do shared or distributed processing.

In shared processing, any computer within a network can call on the calculating power of the entire network when it is faced with a problem too big to handle alone. The professors think that shared processing could let business and personal-computer buyers choose smaller machines because the power of the other in-house computers would easily be available for occasional big jobs.

The toughest question in shared processing, according to Professor Charles N. Fischer, is telling the computer network how to decide the best way to do a particular computing job with an individual computer or with a network of connected computers.

At Wisconsin, researchers will be using four HP 9836A computers with screen displays, printers and disk memories that hold up to 27 Mbytes of information. Each computer will have 1¼ Mbytes of memory.

Research on computer programs needed to manage such a network is in its infancy but is drawing increasing attention. UW-Madison has been active in several such projects during the past year, including one funded by a

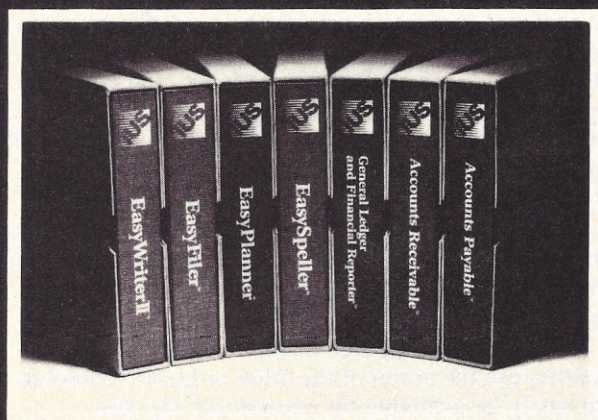
(continued on page 188)

EasyWriter II™ gives you stand-alone word processing functions at a PC price.

Incredible. But true. EasyWriter II is so advanced it gives your IBM Personal Computer the ability to function like an expensive stand-alone wordprocessor. It's simple and easy to use. Faster results than other major PC programs. Yet so powerful it gives you benefits like:

- See onscreen exactly what you print. Not just indents and paragraphs, but boldfaces and underlines, too.
- Complete editing and formatting flexibility using single function keystrokes—not clumsy combinations.
- Simultaneous print-while-you-edit capability.
- "Page orientation" experienced people prefer.

Best of all, EasyWriter II is part of the growing family of IUS programs—EasyFiler, EasyPlanner, EasySpeller, Financial Management Accounting Series and more coming soon. With them—and your IBM PC—you are more productive in communications, business planning and financial management. Write us for a free brochure. Or experience these advanced programs at ComputerLand or authorized IBM dealers.



The Easy Family.

"Pacesetter"; "Excellent"
SOFTALK MAGAZINE

EasyWriter II™



IUS Helping you get the most out of your IBM PC.
2401 Marinship Way, Sausalito, CA 94965
415 / 331-6700

CIRCLE 17

Harry Garland On The Future And The S-100 Bus

As Cromemco's president, Harry Garland is the man who makes the big decisions, but he doesn't neglect the nitty-gritty. When he and Roger Mellin, his partner, started Cromemco from scratch, the personal-computing industry was not yet a gleam in the eyes of those it has made rich and famous. Then it was all detail.

From a small beginning—making sophisticated boards, like analog interfaces, for the S-100 bus—Cromemco has now become, in Garland's words, "the largest manufacturer of S-100 computers in the world."

In electrical-engineering terms, a bus is a way of interconnecting parts of an electronic system. The S-100 bus is the one most used to perform this interconnection in personal computers.

Garland came by his technical expertise honestly. He holds a Ph.D in Electrical Engineering from Stanford University and was assistant chairman of that university's EE department before devoting full time and attention to Cromemco.

It was a beautiful California day when Personal Computing met with Garland in his office in Mountain View. Blue sky, golden sun, clear air—a perfect complement to Garland's natural smile and charm. He's not the least bit stuffy, but he can speak as a nuts-and-bolts engineer about the kinds of computers that meet people's needs.

Discussion centered on the details that will shape the big picture in the future of computing.

I have heard it said—in fact, Steve Jobs said it two years ago—the S-100 bus is dead. No computer is going to use it again.

Garland: Yes, I've heard that. But you know what Mark Twain said about the rumors of his death. And, really, there is still a very important role to be played by bus-oriented machines. The real question is bus-oriented machines vs. single-card implementations of machines.

Single-card machines like the Apple?

Garland: Yes, like the Apple, which is a single card but has a small amount of expandability with an I/O bus. A

"A single-board computer allows a person the lowest initial investment."



bus-oriented machine is more expensive to manufacture. However, in the long run a customer who is looking to upgrade his system has the option to do that with a bus-oriented machine. And it can be done incrementally at a much lower cost than if he bought a single-board machine and had to toss that machine away and buy a whole new machine, whole new software, to implement an expanded system.

So the initial cost of a bus-oriented system is higher. But if—and I think the whole history of computing suggests this is the case—if, indeed, people find the computer useful and then want to expand its capability, the ability to do that incrementally is much less expensive with a bus-oriented machine. So that's the trade-off. The initial purchase price is higher for a bus-oriented machine, but long-term costs of ownership could well be much lower.

So if you found something else that you could do with your computer, you could do it much easier.

Garland: Yes, that's right. Let's say you need to add more memory, or put in an analog interface or an IEEE 483 interface, or you want to add more users to your system—these are all things that can be done at very low incremental costs with a bus-oriented machine, where with a single-board machine it might be impossible to do at all.

Are all minicomputer systems bus-oriented machines?

Garland: Yes, typically. So what we're talking about is definitely a big computer architecture. But that, of course, is not the only way to go; I would never say the single-board based computer is dead. And there's a very good reason for that. A single-

board computer allows a person the lowest possible initial investment and perhaps a very suitable machine for whatever his application is.

But when that application grows he may have a problem; is that what you're saying?

Garland: Yes, indeed. He may have to start with a whole new computer system. And the big cost then is duplicating all the software that he has developed. It may very well not be compatible with that of the new system because, with one notable exception, you can't take the software from a personal computer and move it on up to larger machines.

That one exception you refer to is, of course, your own C-10, I take it?

Garland: That's right. The C-10 is not only capable of using the same software, it's even media compatible. You can take a disk out of the C-10 and plug it into a larger machine and the larger machine will play it directly.

But isn't the S-100 bus a hobby bus really?

Garland: I think not. If you take a look at our current customer base—and we are the largest manufacturer of S-100 bus products—the bulk of our customers are in industrial and professional fields.

Let me put it another way. Don't you have to be some kind of a computer maven to be able to really get the most out of an S-100 bus-based computer? I mean, it sounds very complicated and very technical.

Garland: It's really not. In fact, it's much easier, when you are taking a look at configuring the system, to do it with a bus-oriented machine than any other way. You simply purchase the modules you need for your job, plug them into the bus, and it allows you to really tailor the computer system to your specific needs.

What about addressing and things like that?

Garland: Well, there's no question but that you have to have your memory in the right bank, and you have to set

some switches properly—that sort of thing—which requires somewhat more technical skill than a machine that has no options whatsoever. But for that additional effort you get quite a bit more in terms of modularity.

Is there a standard processor for the S-100 bus?

Garland: The bus was originally designed for use with the 8080 processor. We were the very first people to put the Z80 processor on the bus and, in fact, we were Zilog's (the Z80's developer) very first customer. So the very first application of the Z80 was on the S-100 bus. And now we're the first people to put the 68000 processor on the bus, and I believe that within the next year the 68000

may well become the most popular processor on the market.

One simple reason for this is that the S-100 bus has 100 pins, many of which were not even used with the original 8080 implementation. What this allowed was tremendous capability to expand the power of the bus with time so that the 68000, which has a 16-megabyte address base, can easily be put on the bus. That cannot be done with any other of the original computer buses. And which pins are used for what in the new 16-bit processors is part of what is defined in the IEEE 696 standard, so the nice thing is that everyone will be implementing it the same way.

Well surely other semiconductor manufacturers are looking at that and saying they're going to jump on the bandwagon. They have to come up with some sort of answering product, don't they?

Garland: The 68000 processor itself is multisourced by more manufacturers today than any other 16-bit processor. What has happened is that the 8086 has been used in a lot of designs because it was available sooner. Of course, it is less capable than the 68000, but it is so well entrenched that it will certainly be around for quite some time. I think IBM's use of it alone speaks for the longevity of that product. The 68000 is a much more capable processor, but it has been available in final form for only about the last six months. If you take a look at the new designs of today, they are strongly favoring the 68000. I read that something like seven out of eight new designs use the 68000 over the 8086.

OK, but why do you want a 16-bit processor anyway?

Garland: Well, if you take a look at the range of applications for computers, you can see that some applications are compute-bound and some are not. If you take, say, a single-user word-processing system that is in no way compute-bound, you are limited only by the speed of the typist, by

“In a single-user word-processing system the processor is just loafing along.”



the speed of the printer. And the processor—say, the Z80 processor in our current system—is just loafing along. To take and put a 68000 in that kind of environment is an absolute joke! It's like putting a 1000 horsepower engine in a Volkswagen beetle. It just doesn't buy you anything.

However, there is a class of applications that is compute-bound. Where you get into this is when you have, say, multiuser systems with many people taxing the processor at the same time. Or you get into scientific and engineering applications such as computer-aided design. One application we have for our machine, for instance, is structural engineering where a civil engineer wants a personal computer for designing buildings. It turns out that there are some very complicated matrices that have to be evaluated to be able to design these buildings.

Because you've got a closely coupled physical structure there?

Barland: Right. You're dealing with—to a first approximation—first-order linear differential equations. And it's not unusual to have 100 by 100 matrices (that's 10,000 numbers) to solve. This is the kind of thing that could take many hours or even days with the Z80. But a 68000 would reduce that by roughly a factor of 10—to maybe a couple of hours.

What it is, then, is a big number-crunching application, isn't it?

Barland: That's right. But the other important thing about the 68000 is the address space. With the Z80, you have 64k of address space; with the 68000, it's 16 megabytes. If you take a look at some of the programs that are run today on minicomputers—large programs that have been developed over a period of time—they may well be half a megabyte or a megabyte long. There's just no way that they can be run in any convenient way on an 8-bit processor with a 64k address space. The 68000 opens up
(continued on page 38)

Turn your TV into a time-sharing videotex display for \$399.*

Now you can connect your family to the informative and entertaining world of CompuServe, The Source, Dow Jones News/Retrieval and other time-sharing and data-base networks.

All you need is the RCA VP-3501 Videotex Data Terminal (with built-in modem and RF modulator), your telephone and your TV set. You can get instant access to regional newspapers and newsletters...weather reports and sports results...computer games and more. You can use the VP-3501 to make airline reservations...find restaurant recommendations in cities around the world. Plus stock market and corporate data. Or access your school or business computer. You can even send electronic mail and buy products.

In addition to information retrieval, the VP-3501 provides full interactive communications with a host computer. What you have working for you is a versatile, feature-packed interactive data terminal which can be worth far more to you than its low price. Its unique color-locking circuitry gives you sharp color graphics and rainbow-free characters. You get 20- and 40-character formats in one of eight foreground colors and separate color backgrounds.

With reverse video, you can emphasize certain letters, words, or sentences. A built-in tone generator...plus a white noise generator...let you create everything from the sound of explosions to the sound of music. The spill-proof, easy-to-clean keyboard is highly suitable for hostile environments. And its membrane key switches give you a natural feel.

The VP-3501 is truly a fine Videotex Data Terminal. And don't forget, it's made by RCA...the first name in television...now the foremost name in videotex terminals.

See a demonstration at your computer or electronics dealer, or contact RCA. Order now and you'll get a free password and a free hour's time-sharing on both CompuServe and Dow Jones News/Retrieval! (Limited time offer.)

For more information or to order, call toll-free, 800-233-0094. (In Pennsylvania, call 717-393-0446.) Visa or MasterCard orders accepted by phone. Or send a check including \$3.00 delivery charge plus your local sales tax to RCA MicroComputer Products, New Holland Avenue, Lancaster, PA 17604.

**Suggested User Price.*





THE COMMODORE 64. ONLY \$595.
What nobody else can give you at twice the price.

"THE COMMODORE 64 COULD BE THE MICROCOMPUTER INDUSTRY'S OUTSTANDING NEW PRODUCT INTRODUCTION SINCE THE BIRTH OF THIS INDUSTRY."

—SHEARSON/AMERICAN EXPRESS

They're speaking to a group as interested as anyone else in the future of computers: the people who buy stock in the companies that make computers.

If, on the other hand, you're a person whose livelihood depends on a personal computer—or whose leisure time revolves around one—what follows should impress you even more than it impresses investors.

MIGHT MAKES RIGHT.

The value of a computer is determined by what it can do. What it can do is largely determined by its memory.

The Commodore 64's basic RAM is 64K. This amount of power is unusual enough in a micro at any price.

At \$595, it is astonishing.

Compared with the Apple II+, for instance, the Commodore 64* offers 33% more power at considerably less than 50% of the cost.

Compared with anything else, it's even more impressive.

PILE ON THE PERIPHERALS.

Because the basic cost of the 64 is so low, you can afford to buy more peripherals for it. Like disk drives, printers, and a telephone modem that's priced at around \$100.

This means you can own the 64, disk drive, printer and modem for a little more than an Apple II+ computer alone.

HARD FACTS ABOUT SOFTWARE.

The Commodore 64 will have a broad range of custom software packages including an electronic spreadsheet; business graphics (including printout); a user-definable diary/calendar; word processing; mailing lists, and more.

With BASIC as its primary language, it is also PET BASIC compatible.

The Commodore 64 will also be program-mable in UCSD PASCAL, PILOT and LOGO.

And, with the added CP/M* option, you

will have access to hundreds of exciting software packages.

THE FUN SIDE OF POWER.

The Commodore 64 can become very playful at a moment's notice.

You can use Commodore's plug-in game cartridges or invent your own diversions. All will be enhanced by brilliant video quality (320 x 200 pixels, 16 available colors, 3D Sprite graphics), plus outstanding sound.

The 64's built-in music synthesizer has a programmable ADSR (attack, decay, sustain, release) envelope, 3 voices (each with a 9-octave range) and 4 waveforms. All of which you can hear through your audio system and see in full color as you compose or play back.

NOW'S YOUR CHANCE.

If you've been waiting for the "computer revolution," consider it as having arrived.

Through its 25 years of existence, Commodore has been committed to delivering better products and lower prices.

Today, the company's vertical integration has resulted in the Commodore 64's price performance breakthrough heralded by Shearson/American Express.

Visit a Commodore Computer dealer and discover the 64 soon.

It will expand your mind without deflating your wallet.

CP/M is a registered trademark of Digital Research, Inc.

Commodore Business Machines/Personal Systems Division
P.O. Box 500 Conshohocken, Pennsylvania 19428

Please send me more information on the Commodore 64™

Name

Company

Address

City State

Zip Phone

 **commodore**
COMPUTER

PEC-10

INTERVIEW

HARRY GARLAND

(continued from page 35)

the opportunity of using those software packages at a personal-computer price. So there's a large amount of very sophisticated software, which to date has been unattainable in the personal-computer world, that now can be brought over. *OK, but there are ways of fooling a processor, like bank switching, are there not?*

Garland: Sure, it can be done, but the problem is that then you start to sacrifice speed of execution very, very much. You have to keep swapping back and forth to the disk, and the disk is very, very slow compared to internal memory. So your application then becomes I/O bound. You've put it in a configuration with relatively limited memory—in other words, a non-bus-oriented approach.

When you say relatively limited, you mean as compared to the total address space, I take it? Because we're talking about an eighth of a megabyte start—a quarter of a megabyte maximum, right?

Garland: Yes, a quarter of a megabyte or maybe even a half a megabyte in some machines. But if you take a look at how much they're constraining the 68000, you can make an analogy with, say, the Z80. If you take a 68000 system and limit your implementation so you only use half a megabyte, what you're using is only 1/32 of its memory capability. If you were to build a Z80 system in the same way, that Z80 system would only have 2k of memory. It's interesting—and kind of an absurd analogy—but the MITS Altair computer came standard with a 2k card, and that was thought a lot at the time. Nowadays people are up to the limit of the 64k.

Are you suggesting that five years from now we'll look back and say that any 16-bit computer that had a half megabyte of memory was just such an early implementation that people simply didn't understand?

Garland: Five years from now, it will seem like a joke. We will not understand how anyone could put so little memory with that processor. There's just no question about it.

Why does memory need—perceived memory need—expand like that? Parkinson's Law?

Garland: The reason is there's always a trade-off between price and performance, and memory price has been coming down rapidly and is continuing to come down. You can always use more memory if it is cheap enough. For example, very commonly you'll have a five-megabyte disk drive on a system. Now why do you have a disk drive there and access it all the time? Suppose memory were cheap enough that

“There's a lot of software that has been unavailable that can now be brought over.”



you didn't need your five-megabyte disk drive. Suppose you could store all that information in your main memory. Now you're talking about an improvement in the speed of your computer where you're retrieving documents and storing things, this kind of thing. Your performance is increased by a factor of 1000 in speed because you can access the main memory of a computer 1000 times faster than you can a mechanically rotating disk drive. So, if RAM becomes cheap enough, more and more will be stored there because it's a factor of 1000 improvement in speed.

The numbers are mind-boggling. You say it's 1000 times faster to access main memory than it is to access a five-megabyte Winchester disk?

Garland: That's correct.

And a Winchester disk is itself another 10 times faster than a floppy disk, right? So what you are talking about is something like, say, a 10,000-fold improvement in speed over that of a common personal computer?

Garland: That's exactly right.

Simply by using a 68000 and throwing in lots of memory?

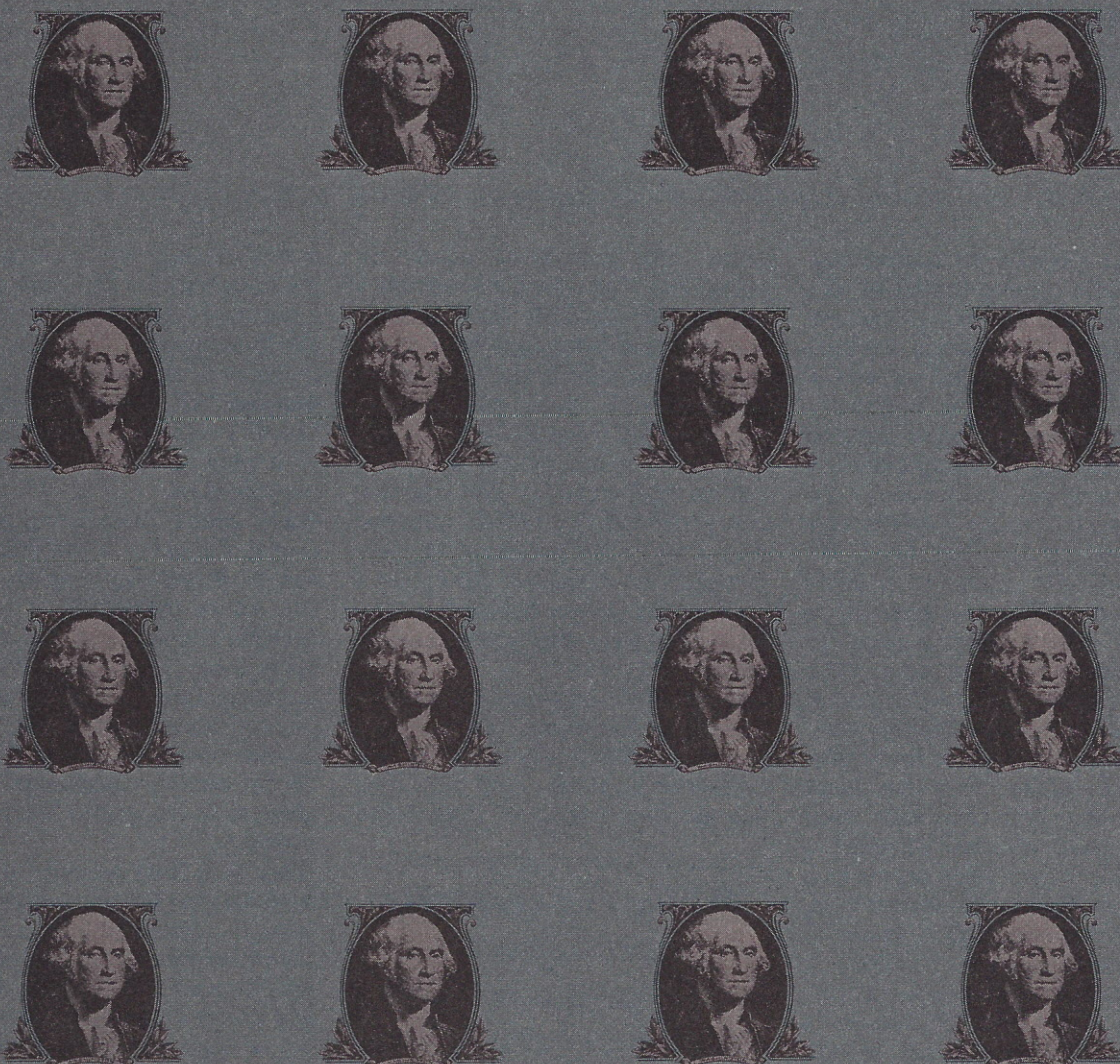
Garland: Lots of memory. And as the price of memory continues to come down, we will continue to move in the direction of more sensible type configurations.

In another year or so, when 256k memory chips are available, what effect will that have?

Garland: We already have a board designed for those chips. We have a 2-megabyte S-100 board, and eight of those will give you a full 16 megabytes.

What's that, roughly, going to cost—for 16 megabytes of memory? What's the comparison with today's prices on that?

Garland: Historically, if you were buying memory for a mainframe computer, the typical price for a megabyte of memory was \$1 million, or a dollar a byte for high-speed



Accept No Substitutes When Choosing An Accounting System

Accounting Plus*, the field-proven, fully-integrated accounting system, offers

- extensive error checking
- 8 levels of password protection
- storage for almost 65,000 records
- immediately accessible results
- complete data entry prompting
- one-time-only data entry
- support for 6 pre-printed forms
- compatibility with hard disk

Accounting Plus features eight modules, all operating on both CP/M** and MP/M**:
General Ledger • Accounts Receivable • Accounts Payable • Inventory • Payroll
Sales Order Entry • Purchase Order Entry • Point of Sale

At Systems Plus you won't find substitutes—only innovative, high quality software for solid software sales and easy installations, backed by the kind of comprehensive dealer support you've learned to expect from Systems Plus.

Accounting Plus distributed by Systems Plus. Accept no substitutes.



Systems Plus Inc., 1120 San Antonio Road, Palo Alto, CA 94303. 415/969/7047

*Trademarked and authored by Software Dimensions Inc. Distributed by Systems Plus Inc. **TM of Digital Research Inc.

INTERVIEW

mainframe memory. Of course, that cost has been coming down and will come down very, very fast as the new chips come up. For example, we have a half-megabyte card that we sell for \$3000. That's \$6000 per megabyte. So you are talking roughly a factor of 100 less than the mainframe kind of historical pricing. What we will see with time is essentially the technology behind this driving prices down. We are using 64k chips for a half-megabyte card. The new chips will be 256k bit chips, a fourfold improvement in density. Ultimately, since chips all cost the same, we're talking about another factor of four decrease in price once 256k chips are implemented in systems. Now that won't be when they first come out; when they first come out, they are going to be expensive. But, if you take a look at three or four years downstream, over that time you'll see a factor of four decrease in memory prices. A half megabyte of memory will cost less than \$1000 in 1985. And that's why we feel it's so important to have an S-100 bus design in the 68000. It allows a person the opportunity to use that inexpensive memory as it's developed three, four, five years from now. And we believe people will want to use it because it will be simply a more sensible balance in the ratio of, say, a hard-disk storage vs. internal RAM.

Are you saying that if I had one of your computers or another S-100 bus computer today, that five years from now I could use that same computer and snap in new cards and be able to access all this?

Garland: With our computer, you can. As a matter of fact, if you bought one of our computers five years ago, you could put a 68000 in it today and put 16 megabytes in it with a two-megabyte card when that comes along.

What about software compatibility?

Garland: What we've done on software compatibility is on our 68000 card, we have included a Z80 pro-

cessor. This guarantees, absolutely guarantees, that all the Z80 software will run on the Z80. Furthermore, our high-level languages have made source codes compatible between the Z80 and the 68000. So, you can take, say, a BASIC program and run our interpreter either on the Z80, our current interpreter, or run the new interpreter on the 68000, and run that same program and get the performance advantages of the 68000.

Now is that a program that I, a user, have developed, that you're talking about?

Garland: It's a program that you developed or a package program that you bought that has been written in a high-level language. The only time you get into limitation is when you

have a program written in an assembly language for the Z80, one that could not be quickly converted to the 68000 language.

It has to be rewritten?

Garland: Yes, it has to be rewritten. But it's in a high-level language, so it only has to be recompiled or reinterpreted.

Well, that's interesting. And, of course, I'm sure you and other people will be developing applications that will run on the 68000.

Garland: Right. There's a lot of work being done. In fact, we will see those applications, I think, very, very quickly because there are a lot of manufacturers, including Apple and Tandy, who have announced they are going to be using the 68000 for their products.

What does "very quickly" mean?

Garland: Very quickly means within a year, or a year and a half.

That means if I bought your 68000-based card today, in a year and a half I should be able to find, say, a math package, if I had a need for it, that would run on the 68000.

Garland: Right. You'll see a whole family of packages available for the 68000s, some sooner than a year and a half. But by then you will have a choice in the 68000 comparable to what you have in the 8-bit world today. And, in the meantime, the 8-bit processor is still a new machine, so you can run 8-bit software until there's software available for the 68000.

In light of all this, I'm curious; why did you go to a single-board design in your new computer?

Garland: The reason, as I said earlier, is that there's a need for both classes of machines. Now the new personal computer does not have an internal bus on it. It cannot be expanded with more memory internally, but it does have the advantage of being lower cost, and there are many people who would prefer to pay less up front to be able to get a lower cost machine. The

(continued on page 44)

"There is certainly more software emerging now than there has been at any other time."



**Finally
you can afford
to satisfy
your lust for
power.**



ZX81



For \$99.95 you can have a full powered personal computer.

Most people know by now that the ZX81 from Sinclair Research is the lowest priced personal computer in the world.

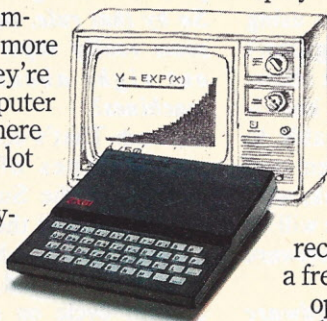
But serious programmers are looking for more than a low price. They're looking for true computer power. And that's where the ZX81 surprises a lot of people.

Just look at the keyboard and you'll get some idea of the ZX81's power. It has more than 60 BASIC commands, 20 graphic symbols, and complete mathematical functions. And there's even more power that you can't see.

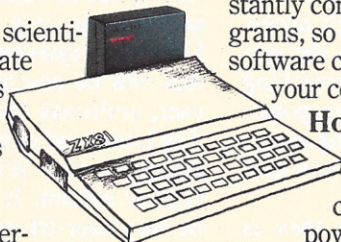
A breakthrough in personal computers. The ZX81 offers features found only on computers costing two or three times as much.

Just look at what you get:

- Continuous display, including moving graphics
- Multi-dimensional string and numerical arrays
- Mathematical and scientific functions accurate to 8 decimal places
- Unique one-touch entry of key words like PRINT, RUN and LIST
- Automatic syntax error detection and easy editing
- Randomize function useful for both games and serious applications
- Built-in interface for ZX Printer
- 1K of memory expandable to 16K
- A comprehensive programming guide and operating manual



Sinclair programs are available



16K Memory Module

The ZX81 is also very convenient to use. It hooks up to any television set to produce a clear 32-column by 24-line display. And you can use a regular cassette recorder to store and recall programs by name.

What you get. When you order your ZX81, you get everything you need to start programming.

It comes with connectors for your TV and cassette recorder, an AC adaptor, and a free programming guide and operating manual that completely documents the capabilities of the ZX81.

Options and add-ons. Like any full-powered computer, the ZX81 can be expanded and upgraded.

Its 1K memory can be expanded to over 16K just by plugging the Sinclair Memory Module onto the back of the unit. The cost is only \$49.95.

Sinclair has also published pre-recorded programs on cassettes for your ZX81. We're constantly coming out with new programs, so we'll send you our latest software catalog when you order your computer.

How did we do it? The question most often asked about the ZX81 is, "How can so much computer power cost so little money?"

The answer is that Sinclair Research simply took a different approach. Our only goal was to make programming power as affordable as possible. So we developed a radical new design that cuts costs dramatically without cutting computer power. For example, our unique Master Chip replaces as many as 18 chips used in other personal computers.

The success of the ZX81 speaks for itself. It is now the fastest-selling personal computer in the world. And we stand behind our product. If anything goes wrong in the first 90 days, we'll repair or replace your unit free of

charge. Even after that, you can take advantage of our national service-by-mail facilities for a minimum fee.

Order now and try it out for 10 days. Simply send the coupon along with a check or money order. For faster delivery, call our toll-free number and use your MasterCard or VISA.

You have 10 days to try out the ZX81. If it isn't all we say it is, just send it back and we'll refund your money.

Why wait any longer? With the Sinclair ZX81, you can finally afford to have the computer power you've always wanted.

Call toll free 800-543-3000. Ask for operator #509. In Ohio call: 800-582-1364; in Canada call: 513-729-4300. Ask for operator #509.

Phones open 24 hours a day, 7 days a week.

Have your MasterCard or VISA ready.

These numbers are for orders only. If you just want information, please write: Sinclair Research Ltd.,

2 Sinclair Plaza, Nashua, NH 03061.



Free guide to programming

To order call toll free: 800-543-3000.

AD CODE AOPC	MAIL TO: Sinclair Research Ltd., One Sinclair Plaza, Nashua, NH 03061.		
	PRICE*	QTY.	AMOUNT
ZX81	\$99.95		
16K Memory Module	\$49.95		
Shipping and Handling	\$4.95		\$4.95
*U.S. dollars	TOTAL		
Name _____			
Address _____			
City _____	State _____	Zip _____	

Sinclair technology is also available in Timex/Sinclair computers under a license from Sinclair Research Ltd.

sinclair

HARRY GARLAND*(continued from page 40)*

reason we've waited till this time to introduce the personal computer is that we're able to do it without deviating from our philosophy of allowing expandability. The expandability comes, though, not with a bus-oriented machine but by allowing a person to use that personal computer as a terminal with a larger Cromemco system, should he wish.

When you speak of expandability, one of the things that comes to mind is graphics. Are you yourself working on more and better graphics?

Garland: Oh yes. We have a high-resolution color graphics display now. Later this year, it will be introduced in a TV camera interface that will allow us to be able to digitize TV pictures in real time. And it's an ongoing area of work.

What does that mean—to "digitize TV pictures in real time?"

Garland: Take, for example, an inventory system. What you will be able to do is have a data base that contains not only a part number and the price and the vendor and the location of an item, but also a picture of that item in your data file. It will be a picture that you take by hooking up a regular home video tape recorder camera to your computer. So when you take an inventory or your receiving department receives a certain part, you can simply call up the file on that item and compare it with a picture to see if you have the proper item. And it's a color picture. So if you're ordering resistors, for instance, you can have the color bands on there and an inspector can compare them to the actual device.

One of the things that we hear a lot about these days is ease of use, and I guess that ties in with graphics. Graphics right now are not easy to use. So I ask what is going to be coming on bus-oriented or single-board machines that you see in the ease-of-use area—to try to make these things easier for people to get into?

Garland: Ease of use is almost entirely a software issue. For example, with our graphics systems we have a program we call "Slidemaster" that allows you to prepare graphics using strictly a bit pad (an X-Y digitizer) with a menu-type approach. It allows someone with absolutely no knowledge of programming to be able to create images and modify them and store them in memory. I think, with time, more and more software will be developed for graphics, but software is what's limiting use today.

But isn't that really a hardware limitation—at least in part? To make things easier to use, don't you need more memory to allow you to put the sophistication into the program?

Garland: In that sense, yes, I think you're right. But once software has gotten up to a certain level of sophistication, more memory, for instance, will make it easier to use simply because things like speed of response can seriously affect ease of use. If you try to do something and have to wait and see what happens through access to a floppy disk, that makes the system harder to use than something that will give you instant response. And, like I said before, having everything in memory will allow you that instantaneous response.

What you're really saying then is that software hasn't even caught up with the 8-bit hardware yet—is that a fair statement?

Garland: That's right, because software cannot be started until the hardware is finished, so software always lags behind. And if you have hardware changing all the time, you're trying to hit a moving target and you never catch up.

Yes, but 8-bit processors have been around for eight years.

Garland: But it has not been eight years since people began seriously developing software. In the early days, people were suspicious of these personal computers. Computing was a thing for some guy to do in a base-

ment, and it's really been only in the last two years that people have gotten serious about it. And it takes two years to write good software.


So by that rule, we should be seeing some really super software coming out right about now for 8-bit machines?

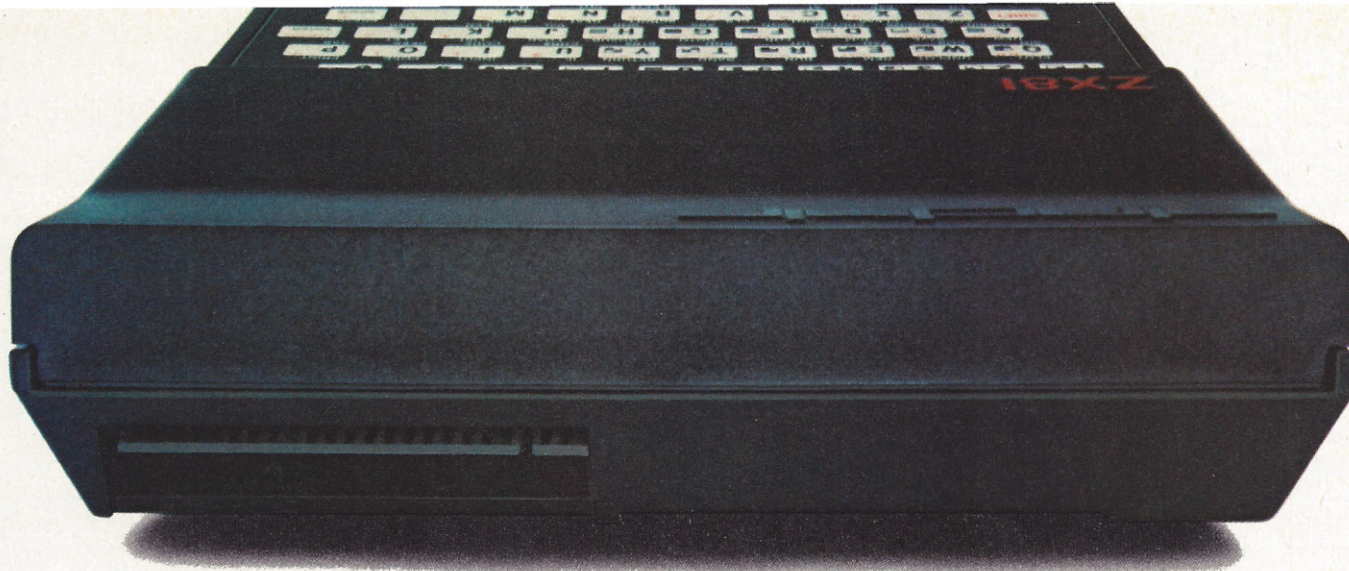
Garland: That's correct. Take a look at the types of packages just emerging—the SuperCalcs and the WordStars and the DBase IIs. These are packages that have all been really quite well received, and yet the development cycle on each of these has really been quite long. There is certainly more software emerging now than there has been at any other time in the past.

Are we also going to see a better operating system? I'm thinking better than CP/M—right now?

Garland: Yes. The question of operating systems has to do with how many capabilities you want from your machine. For single-user, single-task kinds of applications, CP/M has certainly proven itself and seems to do very well. I believe the Unix type systems such as our Cromix will be emerging for the multi-user, multitask kinds of applications. The Unix kind of system is very interesting because it's a very malleable type of system. It can be adapted to be very user-friendly for specific applications. You actually have the option to go in and change what the commands are, and provide a subset of special-purpose commands to any particular user, so that will be emerging, I think, as a rival to CP/M.

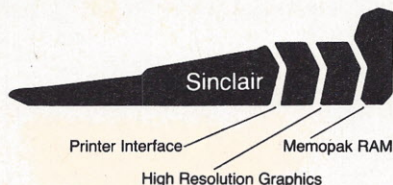
You mean the user kind of sets up his own little virtual machine there?

Garland: He can, although in many cases it takes a programmer to do that. But you can tailor the operating system so that if you have only one user who only does word processing, he has no idea that he is on a computer. He thinks it's a word-processing machine. He turns on his terminal and it comes up with a word-processing menu. 



BEHIND EVERY GOOD SINCLAIR IS A MEMOPAK

If you own a Timex-Sinclair 1000 or ZX81 computer, you should have a Memopak behind it. From increased memory to high resolution graphics, Memotech has a Memopak to boost your system's capabilities. Every Memopak peripheral comes in a black anodised aluminum case and is designed to fit together in "piggy back" fashion to enable you to continue to add on and still keep an integrated system look.



Order at no risk

All Memotech products carry our 10 day money back guarantee. If you're not completely satisfied, return it in ten days and we will give you a full refund. And every Memotech product comes with a six month warranty. Should anything be defective with your Memopak, return it to us and we will repair or replace it free of charge. Dealer inquiries welcome. To order any Memotech product call our toll-free number **800/662-0949** or use the order coupon.

MEMOTECH
CORPORATION

7550 West Yale Avenue
Denver, Colorado 80227
(303) 986-1516
TWX 910-320-2917

CIRCLE 19



Memopak 64K RAM The 64K RAM extends the memory of your Sinclair by 56K to a full 64K. It is directly addressable, user transparent, is neither switched nor paged and accepts such basic command as 10 DIM A (9000). The Memopak 64K turns your Sinclair into a powerful computer suitable for business, recreational and educational use. No additional power supply is required.

Memopak 32K RAM The 32K RAM Memopak offers your Sinclair a full 32K of directly addressable RAM. Like the 64K Memopak, it is neither switched nor paged and enables you to execute sophisticated programs and store large data bases. It is also fully compatible with Sinclair's or Memotech's 16K RAM to give you a full 48K of RAM.

Memopak 16K RAM The Memopak 16K RAM provides an economical way to increase the capabilities of your Sinclair. And at the same time, it enables you to continue to add on other features with its "piggy back" connectors. It is compatible with the Sinclair 16K or a second Memopak 16K or Memopak 32K to give 32K or 48K of RAM respectively.

Memopak High Resolution Graphics The Memopak HRG contains a 2K EPROM monitor and is fully programmable for high resolution graphics. The HRG provides for up to 192 by 248 pixel resolution.

Memopak Printer Interface The memotech centronics parallel or RS232 printer interface paks enable your Sinclair to use a wide range of compatible printers (major manufacturers' printers available through Memotech at significant savings). The resident software in the units gives the ASCII set of characters. Both Memopak printer interfaces provide lower case character capabilities. The RS232 Interface is also compatible with modems.

New products coming soon Memotech will soon be introducing four new Sinclair compatible products: a high quality, direct connection keyboard, a digitizing tablet, a 16K EPROM and a disk drive. Watch for our future advertisements.

Mail to: Memotech Corporation, 7550 West Yale Ave., Denver, CO 80227			
Code: PC-10	*Price	Qty.	Total
64K RAM	\$179.95		
32K RAM	109.95		
16K RAM	59.95		
Centronics Parallel Printer Interface	104.95		
RS232 Printer Interface	139.95		
High Resolution Graphics	144.95		
Shipping and handling	4.95		\$4.95
* All prices quoted in U.S. dollars		Tax**	
** Colorado residents please add sales tax		Total	
<input type="checkbox"/> Check <input type="checkbox"/> MasterCard <input type="checkbox"/> Visa			
Account No.			Exp.
Name			
Address			
City	State	Zip	

More Apple II owners choose Hayes Micromodem II than any other modem in the world. Compare these features before you buy. You should. It's your money. Thousands of other Apple II owners have already compared, considered, and are now communicating — all over the U.S.A. — with Micromodem II. The best modem for the Apple II. The most modem for your money.

A complete data communication system. Micromodem II is not "base priced" plus necessary "options." It's a complete, high-performance data communication system. The printed circuit board fits — quickly and easily — into your Apple II, eliminating the need for a serial interface card. And the Microcoupler™ (included) connects the Apple II directly to a standard modular telephone jack. Auto-dial and -answer features are built-in. Operation can be full or half duplex, with a trans-

mission rate of 300 bps. And it's Bell 103 compatible and FCC approved.

Now there's Hayes Terminal Program, too! Developed by Hayes specifically for Micromodem II, this new

Terminal Program allows you to access all the great features of your modem in a matter of seconds.

With it, you can use your CP/M®, DOS 3.3 or Pascal formatted diskettes to create, send, receive, list and delete files. Hayes Terminal Program is a complete, stand-alone disk.

And because it's menu driven, you can

choose from a wide variety of options to set your communication parameters — as well as change hardware configuration — directly from the keyboard. It even allows you to generate ASCII characters that are normally not available from Apple

keyboards, further extending your capabilities. Incoming data can be printed (on serial or parallel printers) as it's displayed on your screen.

Software sold with Micromodem II or separately. A Terminal Program disk and user manual now come with Micromodem II; or, if you already have one, you can buy the Terminal Program separately.

If you're ready to communicate with other computers, to access information utilities, timesharing systems, or use bulletin boards, then you're ready for Micromodem II. Come on. Compare. Consider.

Micromodem II is already the best-selling modem for the Apple II. Now, with Hayes' new Terminal Program, it's better than ever.

Don't settle for anything less. Available at computer stores all across America.



Hayes Microcomputer Products, Inc.
5835 Peachtree Corners East
Norcross, Georgia 30092 (404) 449-8791

Your Apple II[®]
just isn't the same without
Hayes Micromodem II.™

NEW!
Terminal Program
from Hayes!

™ Micromodem II and Microcoupler are trademarks of Hayes Microcomputer Products, Inc. Apple is a registered trademark of Apple Computer, Inc. CP/M is a registered trademark of Digital Research, Inc. © 1982 Hayes Microcomputer Products, Inc. Sold only in the U.S.A.

CIRCLE 20

It's Easier Than It Looks

If you're a bit awed by the prospect of an encounter with a personal computer, you're not alone.

But the beast can be tamed

by David Gabel, Senior Editor

I had just booted the program and I was trying to run through a little demonstration. I got to the point where the manual said to load a sample file from the disk. I did. While the file was being loaded, I turned the page in the book, and saw a sample of the way the screen should look. I checked the screen, and it didn't look anything like the book said it should. I was certain I had done something wrong, and afraid that the transgression would have a significance beyond my limited power to comprehend—like maybe the program was wrecked.

That's not a computing neophyte talking. That's me—just about a year ago—describing my first encounter with a personal computer.

To put the encounter in perspective, I wasn't a kid. I was 39 years old, and I'd been around. I'd jumped out of airplanes because Uncle Sam paid people to do that. I'd been in Vietnam, been shot at, had run a data-processing center with one of the big computers in it, and had gained a degree in electrical engineering that said I knew about things electrical, like computers. I knew it all.

Now I was sitting in front of an Apple computer, convinced I had done something catastrophically wrong. I hadn't, but I sure didn't know it.

I figured the best thing to do was get an expert. So I got one. And I asked him what in the world I could do now. He took one look, assumed that slightly superior attitude that those in the know reserve for those not in the know (whom they'd just as soon would never get into the know)

and said, "No problem. I'll fix it in a jiffy." Which he did—so fast I never saw what he did. So I asked him to explain. Which he did—so fast I never understood a word he said.

I have to tell you, I was pretty intimidated. For a long time after that, I'd go around at chic cocktail parties or occasional business lunches and say things like, "Personal computer? Oh, yes, I have one in my office. I find it terribly useful." Which was a crock, because it took months before I was able to find it useful at all.

That's only slightly less honest than saying you don't really need a computer but meaning you're not sure you could run one. Some people really mean they're a little scared of the thing. Some mean they're afraid they might wreck it. It's normal to have those kinds of fears. But you can overcome them.

Time to take action

Computing isn't as tough as it looks. It isn't even as tough as it sounds. But you have to get into it. You can't sit on the sidelines and think about it. You can't just read about it and study about it. You have to do it.

That's not to say that all the other things you can do to learn about computing aren't useful. Watching others helps, as does browsing at the computer dealer's, and attending users'-group meetings. Reading about it can give you an idea of what's in store for you. But reading about computing can sometimes hurt as much as it can help. Sometimes it seems that people who know enough about computing to write about it assume that people who don't know

much about computing are dumb. Certainly many documentation writers fall into this category.

Documentation is the set of instructions provided with a piece of hardware or software. Documentation has to be written, even if it's documentation that will appear on the screen as a program is running, or if it's to be found on warning labels affixed to hardware.

People have been saying for a long time that this country is becoming a nation of illiterates. It's easier than ever to believe that after you read some computer documentation. Some is incomprehensible and some is just bad writing. Very little of it communicates. How is one to learn computing if the written instructions can't communicate, particularly if the writer assumes everyone who reads his documentation to learn how to use the hardware or software is dumb, and so insults the reader's intelligence?

Here's an example, taken from a printer vendor's user's manual, in the section on setting up the printer. "With a Phillips-head screwdriver, remove the shipping screws and save them in case you decide later to lend the printer to Aunt Bernice in Lake Wobegon, Minnesota."

I'm sure the writer was trying to be clever and witty. But what he said insulted me. He told me he thought I wouldn't understand, "Save the screws in case you have to ship the printer later." Many people—I'm one of them—will simply refuse to read any further than they must in such a manual in order to get the hardware operating. That's why it's tough

GET A HEAD START WITH PERSONAL COMPUTING

Each day sees more people—businessmen, professionals, educators and home users—turning to personal computers to achieve their goals. And each day more of these same people will be turning to PERSONAL COMPUTING Magazine to help them use and master their computer.

PERSONAL COMPUTING is essentially a magazine of ideas. Ideas for new ways to use your computer and ideas that will stimulate your own creativity.

In every issue, we will tell you how others—from Fortune 500 executives, to small businessmen, to individuals using personal computers in their home—are solving problems and opening up new opportunities. Also, there are feature articles on Business, Professional/Managerial, Home, Leisure, Educational and Advanced Computing.

PERSONAL COMPUTING keeps you informed about new products, too—hardware, software and peripherals that can help you expand the range and versatility of your system. And we keep you up-to-date on events and developments in the world of personal computers. Through special reports and in-depth interviews, we give you a rare glimpse of what lies ahead.

Subscribe to PERSONAL COMPUTING today and SAVE!

Yes, send me twelve information-packed issues of PERSONAL COMPUTING for just \$18.00, the regular subscription price. That's \$6 less than the newsstand price.

I understand that I may cancel at any time, for any reason and receive a full refund for the balance of my subscription.

☐ Payment enclosed ☐ Bill me

Name _____
(please print)

Address _____

City _____

State/Zip _____

Your subscription may be tax deductible. Please allow 6-8 weeks for receipt of your first issue 4AA37

MAIL TO
PERSONAL COMPUTING
P.O. Box 2942
Boulder, CO 80322

ESSAY

to learn computing from reading.

There's just no substitute for doing it. When you compute you'll learn more than you ever thought possible, faster than you thought you could.

That phrase, "Boot the program," for example, is one of the dumbest sounding things in the world. It's indecipherable until you boot a system a few times and totally understand it. It means loading a program, usually from a floppy disk. It's simply telling the computer what to do.

Doesn't the computer know what to do? Not really. The computer can do just a very few things, when you get right down to it. It can add. It can move data from one place to another. It can't do too much more.

Some stupendous results

Still, we know the computer accomplishes a lot. Computers are something like water. One drop of water falling onto the ground makes a very small sound. Then it's gone—all evidence of its existence evaporates into the afternoon sun. But uncounted and incomprehensible numbers of drops of water carved the Grand Canyon. Evidence of their existence will last as long as the earth.

Incomprehensible numbers of computer additions and movements of data accomplish similarly stupendous results—results like word processing, number crunching, graphics.

People have put computer instructions together so the machine can figure out what to do with the input you feed it. When you put information into the computer, it responds by executing a series of instructions that put the data in memory, get other data, operate on those data, get a result, if that's what was requested, and finally show the result to the person who requests it.

As you get deeper into computing, you will begin to believe what I'm going to tell you now. The computer does all the things it does for very logical reasons, and it does only what it has been told to do. The people who

wrote the programs wrote them in a very logical manner. Step follows upon step in a sequence of instructions that lead the machine from its starting point to its end point.

That means you can work with a computer. If you can think logically, you can even "think" like a computer. Because when a computer "thinks," it's only reflecting the logical thoughts of the person who programmed it. If you can do things step-by-step, you can run a program.


Overcoming intimidation

Of course, all this didn't help me a bit that first time I thought I'd blown it with my personal computer. All sorts of disabling emotions were running through me, not the least of which was the overwhelming desire to appear expert before those who expected me to be expert. Think of my background. I had to be smart.

Nobody got me out of my predicament. I did it myself. But it wasn't easy. It took all the background, training and experience I had—the very things that were initially causing much of my intimidation—to finally realize that I could admit I didn't know everything about personal computers. I had to learn that if I did something really drastically wrong the situation was not irretrievable. All I needed to do was turn the computer off and start over again.

So it doesn't surprise me when I find that the top executives in many companies don't use computers. They probably suffer from the same kind of intimidation I felt. And they surely, most of them, haven't the tools I had to get me out of that disabling mindset.

It's a good thing that computing is easier than it looks, and easier than it sounds. If it weren't, none but a very few would be using it now. People would stop themselves, simply because of the way people are. That many people don't gives testimony to the ease of using computing.

So do it. Don't be intimidated. 

Picture this. Presentation-quality bar charts, line graphs, and pie charts. In black and white or color. On hard copy or a CRT. In seconds.

That's PFS: GRAPH. The fastest, easiest, most economical computer graphics software package you can buy.

For the first time ever, computer graphics without computer programming.

With GRAPH, all you do is enter your information and specify the kind of chart or graph you want. GRAPH does the rest. So instead of making a lot of complicated calculations, you can make graphics.

GRAPH is so straightforward, you can begin creating graphs and charts almost immediately. But it also has powerful capability you can stay with for years to come.

For example, you can mix and match line and bar graphs, stack or compare up to four bar graphs simultaneously, even display as many as four graphs on the same set of axes.

Software that pays for the system.

Compared to hand-drawn graphics, GRAPH can save you enough money on your first set of overlays to pay for itself. And over the course of a

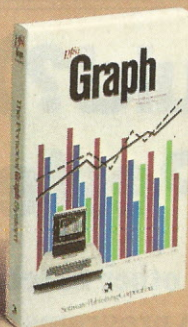
few months, it could save you enough to pay for the Apple® computer system it works on. And that includes a Hewlett-Packard 7470A color plotter.

It even works with VisiCalc® files.

GRAPH is so flexible it allows you to work with raw data, other members of the PFS Series, or even VisiCalc files.

No other computer graphics package gives you all this capability. Combine it with the beautiful simplicity of PFS for information management, and PFS: REPORT for information analysis, and you have a software family that works hard without being hard to work.

So if you're thinking about making it in pictures, go see PFS: GRAPH. It's at your computer dealer now. And if they don't have it, ask them to contact Software Publishing Corporation, 1901 Landings Drive, Mountain View, CA 94043.



pfs:

Graph

Personal software made simple.

YOU OUGHT TO BE IN PICTURES.



*PFS is a trademark of Software Publishing Corp.

*VisiCalc is a registered trademark of VisiCorp.

*Apple is a registered trademark of Apple Computer, Inc.

CIRCLE 11

Could (Should?) An Athlete Be Perfect?

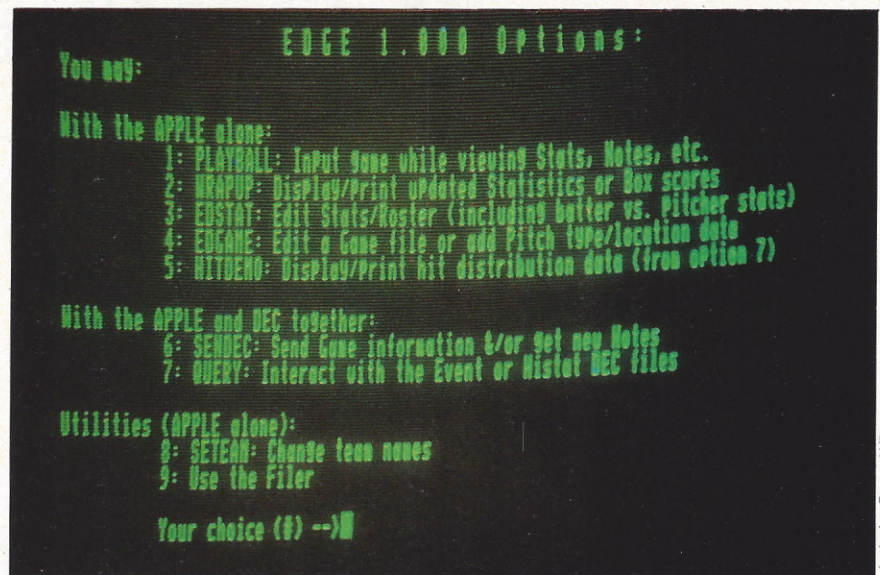
The Texas Rangers—and other baseball teams—are developing sophisticated player evaluation programs for the personal computer in an effort to perfect the athlete's craft and shed a losing image

by Jeffrey Rothfeder, Associate Editor

It was the top of the seventh inning on a hot and steamy August night in Arlington Stadium near Dallas. The Texas Rangers and the New York Yankees were locked in a scoreless pitchers' duel. The Yankees' leadoff hitter began the visitor's half of the seventh with a single to left-centerfield. The next hitter doubled down the rightfield line, scoring the leadoff man. The third Yankee batter singled sharply to straightaway centerfield. Another run scored. And before the inning was over, the Ranger pitcher was knocked out of the box by a barrage of eight hits that led to six runs and a Yankee victory.

The pitcher's season had been going that way—good strong pitching performances marred by one or two innings when it seemed he couldn't get anybody out. Before his next start, one of the Ranger bullpen coaches took the pitcher aside and told him that a flaw had been detected in his pitching mechanics. With men on base—when he pitched from the stretch position and not from a full windup—his right arm didn't follow through completely. Consequently, his fast ball failed to sink but instead rose right into the hitter's power zone. Batters were feasting on chest-high fast balls.

When the pitcher began to pay careful attention to his right arm follow-through with men on base, he gradually restored his motion and his outings improved.



The menu for the Edge 1.000 program offers query-button choices to access a whole range of statistics about the performance of each player on a baseball team.

The Ranger coaching staff would love to take full credit for keen-eyed wisdom in spotting the pitching flaw, but they can't. The credit belongs to an unlikely member of the team's brain trust—an Apple II computer set up to monitor every pitch, hit, run and motion of the Ranger team since the beginning of the season. The computer catalogs the placement of each pitch thrown. When the coaches saw that this pitcher threw differently when men were on base, they were able to pinpoint a subtle problem that had eluded them, and translate those data into corrective action.

What is really at work here is a highly sophisticated form of people management and evaluation. The Rangers are attempting to uncover the not-so-visible subtleties that inhibit the perfection of the ballplayer's craft. The intention is to work with a player's strength and use the personal computer as a training tool to help the athlete achieve his goal of excellence.

The keys to success

For a business, getting the most out of its employees is one of the most crucial keys to success. And to a pro-

fessional sports team—where success is intimately tied to the daily performance of its players—the need to monitor individual ability is especially pronounced. Consequently, a few baseball franchises are leading the way with the development of some of the more advanced personnel data bases currently available for the personal computer. Their story is an account of the way that certain businesses are attempting to gain a leg up on their competition by using the personal computer to evaluate and

improve employee performance.

As one baseball team official put it: "What we are doing (on the personal computer) is simply personnel information development and retrieval, the same as any company would do. The only difference is that our data base is made up of baseball players and not welders."

It is still too early to gauge the kind of influence these data bases will have on the way professional athletes perfect their games. Some teams, the Milwaukee Bucks in basketball, for

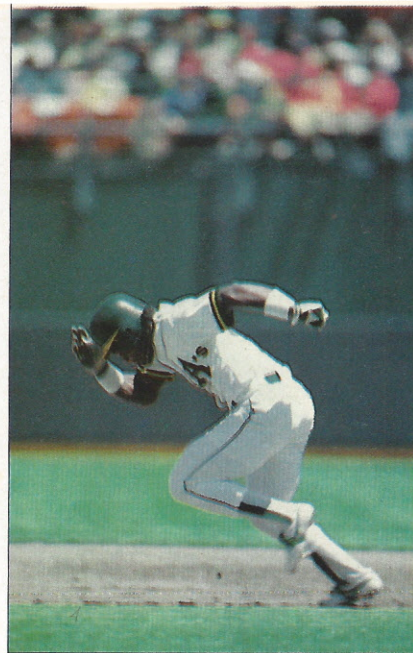


photo by Fred Kaplan

Rickey Henderson of the Oakland Athletics (above) races toward second in pursuit of the major-league stolen-base record. Perfection of this type is what team owners are after when they use personal computers for player evaluation (below).



photo by Doug Wilson



DODGING TREES, ROCKS, CHICKENS, AND COPS AT OVER 80 MPH MAY NOT BE LEGAL. BUT IT SURE IS FUN!

Grab the wheel in *Hazard Run*, our high-speed cross-country chase . . . and watch the feathers fly! It's just one example of the high-involvement exciting game software created by Artworx. At Artworx, we're directly involved with the software we sell. We know our game software is fun to play because our own people can't keep their hands off it. We created *Beta Fighter* to simulate a moonscape battle that will literally take you out of this world! Our

Drawpic software lets people of all ages get hooked with the limitless possibilities of graphic creation. *Golden Gloves* gives you all the thrills and slam-bang action of a super slugfest, right down to the noise of the crowd!

At Artworx, we have a full range of software . . . for people who like to play and people who want to turn work into play. We have text editing, mail list, and analytical programs, to name but a few. How good are they? We

use them in our own business . . . and we welcome your comments and suggestions. We pride ourselves on a line that's complete, unique, diverse, and offers you a great value for a very reasonable price.

At Artworx, we're as accessible as your local computer store or your telephone. Write or call us toll-free at 800-828-6573. We'll send you our free catalog . . . it's good reading and a great introduction to a whole new world of fun.

ArtworxTM
So you can play.

PROFESSIONAL/ MANAGERIAL

example, are using personal computers, but only for keeping statistics that can be used by broadcasters or in public relations efforts. These teams are not yet manipulating the information to produce on-field strategies. Some baseball organizations, however—the Chicago White Sox, the Texas Rangers, and, to some degree, the Oakland Athletics—are building up a vast reservoir of computerized player-performance information, which they hope will soon actively influence team play and lead to long-awaited championships.

Disappointed bridesmaids

The last time the White Sox won the World Series—or any other title—was in 1959. Since then they've watched high-priced and highly touted baseball talent like Bobby Bonds and, more recently, Ron LeFlore come, and sometimes go—failing to live up to their promise and help produce a winning team. So, perhaps because they have been perennially disappointed bridesmaids—or perhaps because they are now under a revamped, more forward looking ownership—the Chicagoans were enticed early this year by the promises of two sports lovers and computerphiles, Matt Levine and Dick Cramer. These two men offered the White Sox a customized program for the Apple II that digests and catalogs every single action and nuance of each baseball game. The package, called Edge 1.000, gives back the collected data in any variety of statistical ways, permitting club management to make a host of conclusions about the team's playing personnel.

After almost a year of working with Edge 1.000, White Sox officials say they are now collating the season-long information that they will use to make player improvement and personnel decisions during the coming winter layoff. No definitive results have yet been reached, but team executives are not short on ideas about how they intend to make Edge 1.000

work for the White Sox. "The kind of information we're developing shows, for instance, that certain batters hit better when the count is 0 and 2 on them than when the count is 2 and 0," says Jack Gould, a White Sox vice president. "This, we conclude, is because the player has better concentration when the count is stacked against him. We haven't gone to a ballplayer with these results yet because we want to build up a complete data base first."

Gould adds that the decision to purchase Edge 1.000 and the Apple computer was not a difficult one for an organization of modern-day corporate managers who represent a sharp contrast to the tradition-bound baseball men of the past. "In our club many of the officials are very successful businessmen," he says. "And we know that in order to survive today, even if you're the corner grocery store, you have to own a computer."

It is an interesting sidelight, then, that the baseball world's acceptance of a business tool, like the personal computer, is spawning sophisticated employee performance evaluation methods that will, in turn, be especially useful in the business world at large.

A bird's-eye view

After each game, a White Sox scout, who gathers the playing data from his perch behind the home-plate screen, inputs the detailed information—the type of each pitch and its location, precisely where the ball was hit, who fielded it, how the play was concluded—into the team's Apple. From the Apple the information is sent to a DEC 1092 mainframe in Philadelphia, via modem, where it is stored. And before the next day's game the data are downloaded from the DEC to the Apple, collated into the type of statistics that team officials want to see, printed out and then circulated among management.

Dick Cramer, who develops pharmaceutical products using computer



MicroGANTT™ You control your project.

MicroGANTT is a sophisticated project planning system which uses Critical Path Method (CPM) techniques and PERT to determine task dependencies and project completion dates. The user creates tasks, assigns costs and defines task dependencies. The interactive system immediately redisplay the project plan as data is entered. Projects are displayed as Gantt charts, labor time summaries and financial summaries.

MicroGANTT features: ■ Time scale of days, weeks, months, quarters or years can be varied at any time to present more or less detail. ■ Accommodates unlimited number of tasks in a project plan. ■ Detailed sub-projects can be included as tasks in a project model. ■ Assumptions are easily modified to make "What if?" analyses. ■ Single key-stroke commands page through tasks and calendar of events on display screen. ■ Single key-strokes switch the display from Gantt chart to labor time summary to financial summary. ■ Partial allocation of manpower to tasks. ■ Partial completion of prerequisite tasks. ■ All charts, reports and plans can be printed.

Available for **IBM Personal Computer** and CP/M compatible computers. Software and manual \$395. Manual alone \$25.

4 ways to order:

- Write Westico, Inc., 25 Van Zant Street, Norwalk, CT 06855
- Call (203) 853-6880
- Telex 643-788
- Dial-up our 24-hour computer (300 baud) (203) 853-0816

copyright © 1982 Westico, Inc. **WES-44**

WESTICO
The Software Express Service

“The intention is to use the personal computer as a training tool to help the athlete achieve his goal of excellence.”

technology for SmithKline Beckman Corporation in Philadelphia, is the designer of Edge 1.000. Interestingly, Cramer says that his psychological habit of dealing with organized mental models and patterned statistical formulas makes his two occupations—being a SmithKline chemist and a player data-base purveyor—compatible. As for Edge 1.000, he adds that spelling out specific flaws and strengths in the makeup of a team's personnel is where the system will truly shine. For instance, the weak link in what was expected to be a championship White Sox team this past year has turned out to be the pitching staff.

“One analysis that might be done over the winter will be accomplished by dividing the strike zone into nine squares,” Cramer says. “And if you take square D4 as an example, we will question whether certain White Sox pitchers were hit harder than the average major league pitcher when he pitched to that spot. If we find that they are, then we can jigger the statistics to determine if an individual pitcher simply didn't have good stuff or good mechanics when he pitched to that square. Or we can determine if the pattern of pitches he used telegraphed that he was going to come in at that square at the same count for each batter.”

Circus catches and fast reflexes

For a more concrete example, last year Cramer independently documented that the dominance of the young pitchers on the Oakland Athletics in 1981 was due in large measure to superb fielding by the team's fleet-footed outfielders, Tony Armas, Rickey Henderson and Dwayne Murphy. Without their circus catches and quick reflexes on hard line drives, Cramer's statistics showed, the Oakland throwers would never have compiled the kind of excellent records that they did. And with the A's recent purchase of the Edge 1.000 program and a disappointing

campaign in 1982, Cramer plans to help the A's use their Apple computer to determine whether, this year, it was lapses in outfield play that hindered the pitching staff's overall performance.

Moreover, critics have questioned whether Oakland manager Billy Martin overworked his starting staff in 1981, which could have led to the pitchers suffering from arm fatigue during the whole of the 1982 season. The Apple will be asked to help answer that question also.

But is it complicated?

“We can check this by gauging the changes in a pitcher's performance as he goes each additional inning in a game,” Cramer says. “If he is tiring in, let's say, the fourth inning—much too early for a major leaguer to grow fatigued—then this will show up in the overall effectiveness of his pitches from that inning on. This issue is very important to the A's. They're asking us a lot of questions about this.”

A concern of all businesses turning to computerized personnel evaluation—and one that these sports franchises are grappling with—is whether the new method will be complicated to use and understand. If the information cannot be culled simply, then it has no value to the organization or corporate manager. But it is in this area, many involved in the field say, that the personal computer has made a significant breakthrough. It turns the control and retrieval of the data over to the users without requiring a great deal of computer expertise in return.

“From my point of view this new type of strategic personnel evaluation is only possible because of the development of the mature personal computer,” says Cramer. “Baseball people are not interested in computer technology; they are interested in getting a lot out of their statistics. So the program I've written is one that is easy to use for data input, output and editing, and one that gets results

quickly. Because of the incredible power of the personal computer, you can now get this kind of information when you want it and in the form you want it.”

Personnel evaluation and management is a complex issue with many variables peculiar to each organization. So customized programs like Cramer's are often the right approach, rather than canned data-base managers that may not be flexible enough to be integrated into the needs of an individual franchise. Cramer works with his client-teams to develop separate systems that answer their particular questions. He also takes into account the fluidity of personnel management, changing the input and output of the program as often as the organization needs it. Moreover, Edge 1.000 has query buttons and menu commands that allow its users to bypass understanding the intricacies of the system, but lets them get their data in and out with only the pressing of a few, well-marked keys on the keyboard.

The computerized personnel plan used by the Texas Rangers is the brainchild of Craig Wright, the team's statistician, who gained a good deal of notoriety this past season for a report he compiled on the managerial miscues of skipper Don Zimmer. Zimmer was fired in July, soon after the study was turned over to the Ranger top management.

Taking the bull by the horns

When Wright first came to the team in September 1981, the Rangers already owned an Apple, but it wasn't being used. Management felt that they had to reorganize the way the players were monitored and evaluated. They bought a computer to help them achieve this, but they had no idea where to begin. So Wright hired Jan Kern, a computer programmer and the wife of then-Texas pitcher Jim Kern, to set up a personnel data base that suited the needs of the Rangers. The system, Jan Kern says,

**Use numbers to make
assumptions or forecasts? Then use
the one program that has the power to
do more for you:**

SuperCalc™

by Sorcim

The SuperCalc™ program is designed for the business professional who doesn't have a background in computer programming yet wants the most powerful electronic spreadsheet money can buy.

SuperCalc™ allows you to change a variable and understand instantly how that change affects your assumption or forecast.

SuperCalc's exclusive AnswerKey™ walks you through the program quickly and easily. Don't buy a spreadsheet program without first learning about SuperCalc.

Send me your brochure, **The Power of SuperCalc™** which explains the SuperCalc™ program in everyday English.

Name _____

Address _____

City _____ State _____ Zip _____

Send this coupon or write **SuperCalc™ Brochure** on the back of your business card and send to Sorcim Corporation, 405 Aldo Avenue, Santa Clara, CA 95050 (408) 727-7634

The powerhouse of software.™

SORCIM

"When Babe Ruth was asked how he could rationalize earning more than President Hoover, he answered simply: 'I had a better year than he did.'"

will begin to show results during the off-season and throughout next year's campaign.

Essentially, the Rangers' system works like the one used by the White Sox and the A's. "We have one man who keeps charts during the game of all the pitching and hitting variables," Wright says. "Then after the game somebody else inputs the data into the computer. This is such a meticulous process that it takes three hours to complete—sometimes longer than the game took."

The difference, though, lies in the storing of the information. The Rangers are keeping all the data on personal computer floppy disks rather than warehousing those data in a distant mainframe.

Ranger management intends to use the computerized statistics extensively, to turn around a pattern of losing seasons and unproductive personnel that has been developing since the team came to Texas from Washington, D.C. in 1965. For instance, the program will attempt to work on poor playing mechanics, such as the problem shown by the pitcher previously mentioned. But even more than that, a failing organization has to question how it has not been able to plug the holes that have consistently plagued its operation.

"We're looking at the total team picture, including the aging process, the training process, which specific but maybe unseen gaps have continually stood in the way of producing a winner, and so on," Wright says. "Beyond that we are currently evaluating the value of the major league scouting bureau that we belong to (a seven-team consortium that shares scouting reports). We are trying to find out if it would be better economically and success-wise to go with private scouting or to stay with this group."

Armed with all this new personnel information, the teams are chomping at the bit to fully implement the systems in their organizational struc-

tures. The personal computer is a tool that touts the concept of reducing extraneous data and paperwork for efficiency. And the underlying reason for personnel evaluation software is to afford management a clearer picture of employee progress and work habits, so that decisions can be made with the reasonable certainty that they are not misguided. Thus, the sports franchises are looking forward to finally avoiding endless stabbing in the dark when personnel options are considered.

Free agents and negotiations

For instance, team officials intend to use the information taken from the computers as back-up data when negotiating salaries with players, when making trades, and when considering free agents to sign. Many profligate owners have spent imprudently and hastily in this market, only to receive little on-field success in return. In addition, Jack Gould, the White Sox vice president, hopes that the mounds of paperwork and statistics are finally going to be tamed and made manageable and understandable.

"Last year we went to the winter meetings (where the owners consider trades and other signings) carrying three trunkloads of information that were hard to use when decisions needed to be made," Gould says. "This season we'll be carrying only an Apple II computer, some diskettes and a modem to download data from the DEC in Philadelphia."


But before any rush to computerized employee management occurs, there is a danger to be considered. Any new plans have to be implemented slowly and sensitively within the normal organizational structure, lest employees grow uncomfortable and frightened. As often happens when computers are brought into the workplace, people could feel that they are being watched by an electronic "Big Brother" that is out to catch their faults and mishaps and

give management reason to punish them. Sports franchises, tied closely as they are to productivity, are particularly aware of this.

Here lurks the danger of abuse

"We expect some initial resistance from the players when we approach them with bona fide data cataloging their entire season—where they slipped up and how they can improve," says Wright of the Rangers. "We're trying to correct their errors, but they might see it just as criticism. We expect a much greater reluctance on the part of hitters to accept our results. Pitchers tend to be more analytical about their jobs, perhaps because they have the luxury of reflecting on their performances over a period of days. So they will probably be more open to what we are saying. Hitters, on the other hand, don't appear to think in that way. We'll consider this very carefully as we seek corrective action."

Jan Kern, the Ranger programmer, adds: "Certainly there's the danger of abuse. Management may go into salary negotiations and say to a player, 'Here is everything you've done in cold, hard statistics, and this is all you are worth.' It takes away the human element. That's the problem with all statistics; they must be used carefully. I hope management doesn't abuse the players."

Many baseball fans have resisted the notion that the boys of summer are involved in a world of high corporate competition. But the arrival of the personal computer may be the most recent sign that baseball is a business. And before we take out our handkerchiefs and bemoan the loss of innocence, we should let Babe Ruth remind us that the innocence never really existed. When he was asked in the late 1920s how he could rationalize earning more than President Herbert Hoover, Ruth answered simply: "I had a better year than he did." And that, in baseball, as in business, as in politics, is the bottom line. 

First, the *IBM Personal Computer*, The Next Step . . .

Tecmar



The **TECMAR** Expansion series is the first and only, complete line of expansion options available for the IBM Personal Computer.

Now totaling over twenty-five separate options, the **TECMAR** series gives you the broadest range of expansion available for your IBM Personal Computer.

SYSTEM EXPANSION with a complete Expansion Chassis providing six additional system slots, a separate power supply and styling that complements the IBM system.

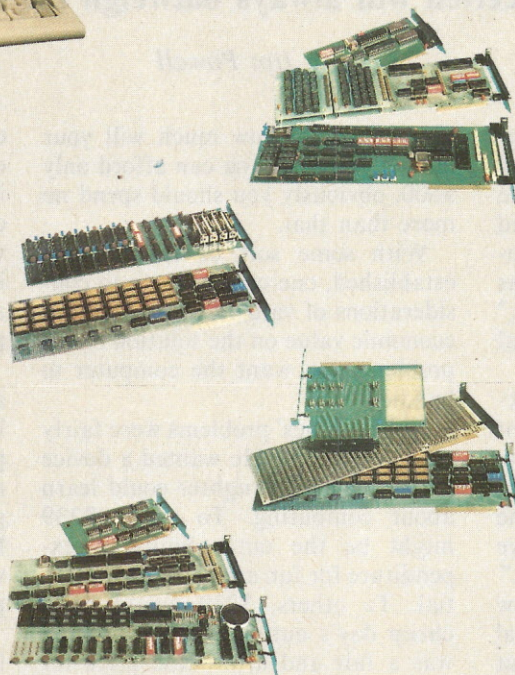
MEMORY EXPANSION in 64K, 128K, 192K and 256K Byte increments of Dynamic RAM with parity, 32K Bytes of Static RAM, 32K Bytes of CMOS RAM with battery backup, or up to 128K Bytes of Read Only Memory.

PRACTICAL EXPANSION with two Serial ports and one Parallel port on a single board, or a Time of Day calendar with battery backup, a Voice Synthesizer with vocabulary in ROM and phoneme speech generation, even a BSR X10™ device controller for lights and appliances.

DISK EXPANSION through the addition of a five or ten megabyte Winchester disk. The disk options come enclosed in the **TECMAR** Expansion Chassis, providing additional expansion slots as well as Winchester disk storage. This approach assures you of unmatched system expandability for nearly any application.

FUNCTIONAL EXPANSION is also available with **TECMAR** Speed Disk™ and print Spooling Software that give new functionality to memory options.

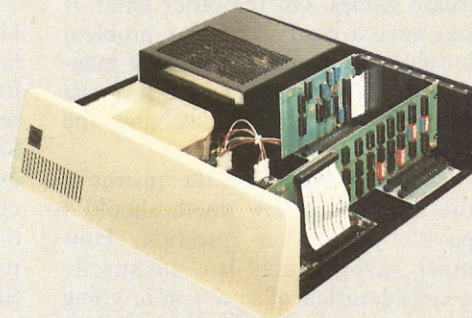
UNMATCHED EXPANSION for the serious IBM Personal Computer user through these and the many other **TECMAR** Expansion products available through participating **COMPUTERLAND** stores, and other fine computer retailers nationwide.



LABORATORY/INDUSTRIAL EXPANSION through an IEEE 488 interface, the Lab Tender with an 8 bit A/D and D/A, or the Lab Master for 12 bit A/D and D/A, a two axis Stepper Motor Controller, or the Parallel Digital-In/Digital-Out Base Board™, Video Digitization with Video VanGogh™.

DEVELOPMENT EXPANSION using an E+EEPROM programmer, Protozoa prototyping boards or a **TECMAR** Extender card.

NEW PRODUCTS are currently under development with many soon to be announced. At present shipping 26 unique IBM add-on products, we are still looking for needs to meet. If you have an need for a new product for the IBM Personal Computer, and would like to ask us about it, give a call on our Product Input Hotline at (216) 464-8317.



For IBM Personal Computer Expansion, TAKE THE NEXT STEP . . .

Tecmar Inc.

PERSONAL COMPUTER PRODUCTS DIVISION
23600 Mercantile Road, Cleveland, Ohio 44122
Telephone: (216) 464-7410 Telex: 241735

What Should You Pay For Your Computer?

The answer isn't simple. You have to weigh a host of factors. But you can be sure that the value received will always outweigh the cost

by Jim Powell

Robert Jones, a retired federal employee in Virginia, is delighted with his \$239 personal computer. He writes programs as a hobby and teaches his daughter about computing. "Everybody thought I was crazy spending that kind of money," he says, "but I did and I'm real pleased."

Herbert Schlomann, a Hackensack, N.J. manufacturer, spent \$8500 for a personal computer to handle payroll, accounts and inventory. "We got our money's worth," he says. "It has saved us money. I have better control of the business now."

As these examples suggest, how much you should pay for a personal computer depends on what you want it to do for you. You don't need an expensive number cruncher for electronic games. On the other hand, if you have a costly, complex problem to solve you would be throwing money away if you settled on a low-cost machine incapable of solving the problem.

In a very real sense, the answer to the question, "How much should I pay?", is another question: How much have you got? It is not strictly a consideration of how you're going to use the computer that determines the right expenditure. There is also a

big element of how much will your budget allow? If you can afford only \$500, obviously you should spend no more than that.

With some sort of fiscal limits established, one can move on to considerations of value. Can you put an economic value on the solution to the problems you want the computer to handle?

Robert Jones' problems were fairly straightforward. He wanted a device with which his daughter could learn about computing. To some, \$239 might be the outer limits of expenditure for fun and learning potential. To others, \$239 would be a cheap day's outing. To Jones, \$239 was a fair and affordable price for the value he expected to receive.

Problems cost money

Herbert Schlomann, on the other hand, had problems that were costing him money. An outside computing service was one possible solution. An \$8500 personal computer was a less expensive solution. Indeed, it was a choice that cost nothing at all, for it quickly saved more in ongoing expense than the outlay cost. As Schlomann continues to discover more things that he can do with his computer, the savings are like found money.

Many other computer buyers are having similar experiences. Some are frightened about the initial step into

computing—after all, any purchase of consequence causes some trepidation. Others dive into the purchase with freewheeling *élan*. But whichever the case there is a refreshing result: The value of the computer almost immediately outstrips its price.

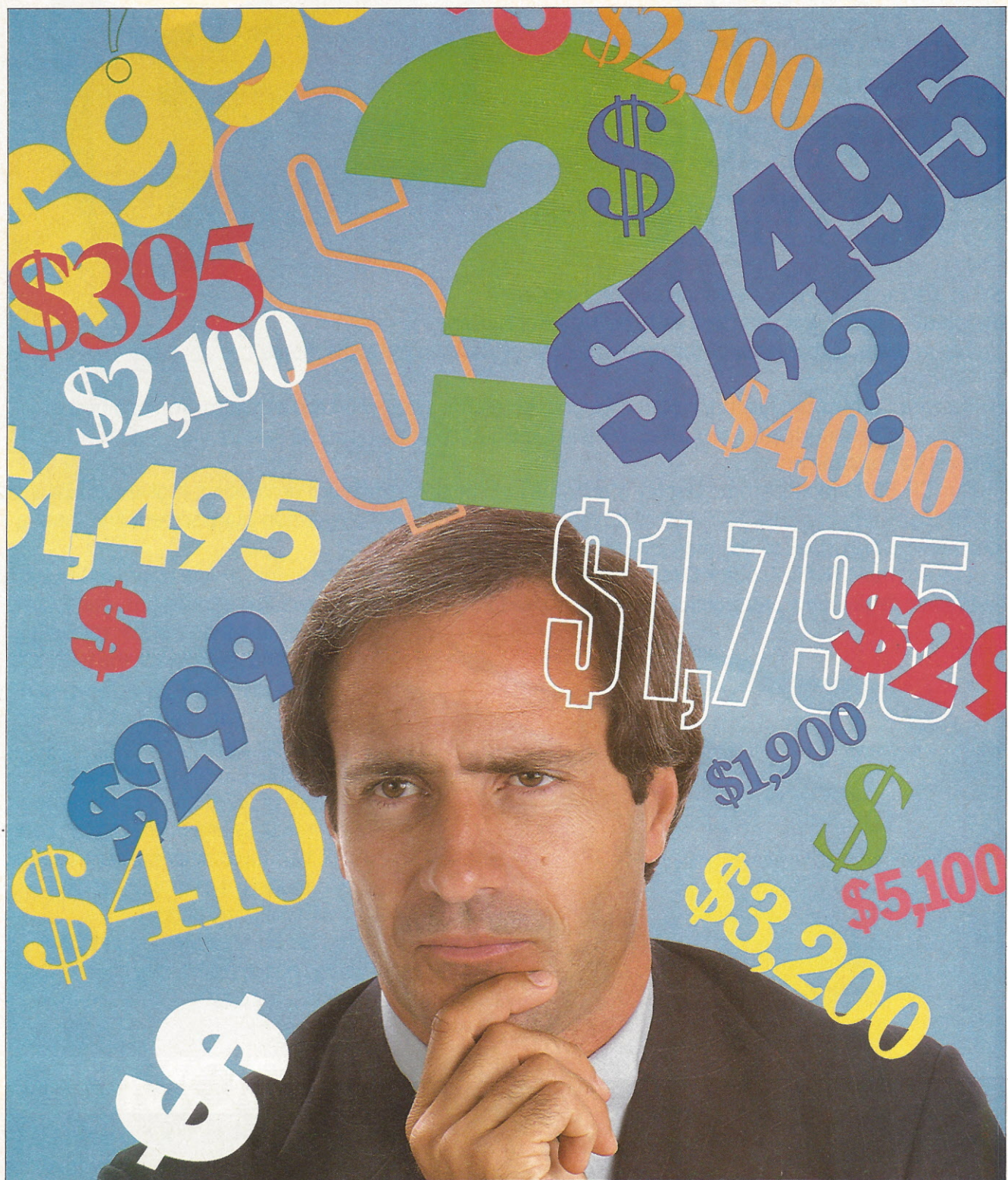
Case studies abound. Ken Rehler, a San Antonio architect, for instance, bought a \$6000 Vector Graphic computer for his firm five years ago. Six months later, an interior design program Rehler developed with it netted him a \$300,000 contract from Southwestern Bell. Rehler credits the computer for the Southwestern job.

Thus, a computer purchase that at first may be accompanied by extensive analysis becomes, in the end, simply the right choice. The computer, because of its immediate rewards, is one of the few purchases that more often than not gives the consumer tangible evidence that he made the correct decision.

Some experts have attempted to quantify the variables involved in the purchase of a computer, especially for the small businessman. One consultant claims that a personal computer can easily increase a manager's productivity by 10 percent. From that benchmark, he concludes that one measure for a manager to use when purchasing a computer could be to spend 10 percent of his salary.

"If a manager is making \$40,000 a

Jim Powell's articles on general and scientific subjects have appeared in three dozen magazines.



design by William F. Goodenough, photo by George B. Fry III

We made one thing perfectly clear. Then we made two more.



What are the things you want most out of a monitor? Resolution, right? And what you want next is affordability.

The problem is that most of the time, you can't get both in the same monitor. Now you can.

Because Comrex has just the monitor for you. No matter what you need a monitor for. And best of all, our CR-5500 monochrome and CR-6500 and CR-6600 color monitors all feature very high resolution. And very affordable prices.

Our CR-5500 Monochrome Display Monitor is just the thing for word processing. It gives you 24 lines of 80 characters in a crisp 5x7 matrix. It features a 12" easy-on-the-eyes non-glare screen. And it has a geometrical distortion of less than 2% of picture height.

The Comrex CR-6500 Color Display Monitor features a 13", high-resolution, in-line color picture tube, automatic degaussing, and a built-in speaker with audio circuit. It's compact and lightweight. And it costs hundreds less than comparable units.

And if you want the best, it's our CR-6600. Its RGB signal gives you higher resolution than composite signals, and eight display colors for brilliant graphics. It's compatible with virtually any micro. And at about half the cost of many competing models, it's compatible with virtually any budget.

Ask for Comrex Monitors at your favorite computer store. They're the best value in monitors on the market. Clearly.



COMREX

INTERNATIONAL INCORPORATED

3701 Skypark Drive • Suite 120 • Torrance, CA 90505 • (213) 373-0280

"Can you put an economic value on the problems you want the computer to handle?"

year, and his productivity can be enhanced with a computer, you're talking about a \$4000 investment," says consultant Howard Anderson of the Yankee Group in Boston. "I believe this happens to be an optimal investment with current technology for \$4000. You can accomplish 90 percent of almost anything you'd want. You can get 95 percent for \$8000 and 100 percent for \$20,000."

The likely lower limit for a business or professional person? Richard Levine, the national director of management consulting with the accounting firm of Main Hurdman in New York City urges his clients to spend no less than \$2000 if they expect to use the computer effectively in the daily operation of a business.

Interesting as these figures may be—and as accurate as they may be—many computer users are shying away from such simplistic answers. The value of the computer, they say, is in what it brings to users and to their businesses. In the end, it may be difficult to specifically quantify efficiency, productivity, and enhanced creativity, but it is not difficult to bask in the improved quality and worth of one's life and business.

So the question of what you should pay for your computer is, in many ways, not one that should cause consternation. Probably, whichever computer you buy will enable you to improve considerably on what you were doing before. But there are a few salient considerations to ponder: how much you can afford, what your current computing needs are, and what your computing needs will be in the coming years. With these considerations in mind, walk yourself through the following eight questions that can help you determine what's worth paying for and where you might want to save some money.

• *What kind of software?* This is the most crucial question, since without a program a computer is just fancy scrap metal. No matter how appeal-

ing and inexpensive the hardware, it is over-priced if programs available for it don't serve your needs well.

For instance, there are dozens of business programs on the market, but if you want to computerize inventory records on 10,000 items, perhaps only three or four programs would have that much capability.

When business people need to make marketing or financial projections, there are several spreadsheet programs to choose from. The best-known, and for many people the easiest to use, offers as many as 63 columns across, 264 rows down. "I'd say these spreadsheet programs help us do our job five to 10 times faster,



Main Hurdman's Levine: Spend no less than \$2000 to use the computer in the daily operations of a business.

while improving accuracy," responds a Union Carbide manager of information systems, based in Danbury, Conn.

The simplest word-processing programs enable you to create copy, delete copy, store copy and print it. They use uppercase letters only. Such programs might do for limited amounts of copy, but they require a lowercase adapter to generate readable correspondence.

Long copy jobs call for much more sophistication—chiefly, the capability to move blocks of copy around.

Probably you'd want automatic page numbering, formatting, search and replace functions, too.

Each program involves trade-offs you should become aware of before making a purchase. Some programs are exceptionally easy to use. Some make it easy to lose copy. Good programs have built-in safeguards that protect against unintentional deletion. After you've made an error, some programs make it simple to get back on track.

"A well thought out premium-priced program can help you achieve sharp gains in productivity, and return your investment faster than an inexpensive program that might not give you all the files and other things you need," says Tim McMahon, manager of the computer division of Venture Development, Inc. of Wellesley, Mass., an electronics consultancy.

But despite its crucial importance, a program is a small part of the total system cost, commonly 5 percent to 10 percent. A letter-writing program might cost \$20, a highly sophisticated word-processing program up to \$1000, a payroll program \$200. You won't realize significant savings price-shopping for programs, but you could be sadly disappointed if the computer you choose won't accommodate the program you need.

To help select the right program, find out what programs are used by people with needs similar to yours. If you don't know anybody with similar needs, contact a computer club or ask a dealer for names. And question the dealer about the advantages and disadvantages of specific programs he suggests.

When you find a program that interests you, examine the manual carefully. The table of contents should list its features. If you don't find what you want, it's a good bet that it isn't in the program. Check to see if the manual is easy to follow, full of illustrations and concise. Often a manual is available separately

“Whatever the case, there is a refreshing result: The value of the computer almost immediately outstrips the cost.”

for \$25 to \$35, and the amount is often credited to you in the event you buy the program.

● *How much memory?* The memory area is where the work is done. Memory requirements depend largely on the software you choose and, to a lesser degree, on the amount of data you'll be working with at one time.

Memory, formally known as Random Access Memory (RAM), is expressed in terms of bytes, each about equal to a single character. A couple of kilobytes, or 2k, would be 2048 bytes—enough to fill a standard size page of typewriter paper.

According to computer consultant Robet Rinder, author of *A Practical Guide to Small Computers*, most personal and professional users can do fine with 16k to 48k memory; typical small-business users need 32k to 64k. Some small businesses and heavy users of word processing require 48k to 256k and up.

You needn't worry about exactly how much memory to buy, as long as the computer you're considering is upgradeable. A 16k memory-expanding board costs about \$150—a 128k expansion memory about \$550. The trend is toward more and cheaper memory.

Keep in mind that each computer has a limited number of slots for hooking up additional capability. If you want to hook up devices like a graphics display, you'd be better off spending more money for a single 16k expansion memory, for instance, than for two 8k memories, thereby making one more slot available.

The computer waits

Not all memory is equally fast. If a particular memory takes longer to retrieve instructions than it takes to process instructions, the computer goes into a wait mode. For a casual user, split-second delays won't make much difference. But if you anticipate heavy data processing, make a point of noticing whether the ma-

chine does its job with satisfactory speed. Generally, more expensive computers tend to have faster memories. (For a more thorough parenthetical discussion of memory expansion, see “More Computer Muscle to Power the Machine” on page 88.)

● *What kind of chip?* The heart of a personal computer is the microprocessor chip whose power is expressed in bits, the most basic data. The more bits a microprocessor can handle at one time, the more powerful the computer, and the faster your job will be done. Most low-end computers have 8-bit microprocessors, but more and more manufacturers are switching to 16-bit and a few to 32-bit. Other things being equal, you'd prefer more power.

Of course, all things are seldom equal. The program that suits your needs best might be written for an 8-bit microprocessor—a specific 8-bit microprocessor like Motorola's 6502. A 6502 program can't always be used on a computer powered with Zilog's Z80 microprocessor.

Since the most powerful microprocessors are comparatively new, there are more programs available for less powerful microprocessors. Moreover, extra power adds cost. So while power is something you'll keep your eye on, often it will give way to other considerations as you seek the best trade-offs.

● *What kind of storage?* The least expensive systems store programs and data on cassettes. This is adequate for casual users. Robert Jones raves about his little computer that “has a cassette built right into it, and I record and save my programs. It works perfectly.”

If you go with a cassette system, check the quality of the cassette player. Most important: Check to be sure that the tape speed is even. You want to put your money in a reliable tape drive, and you'll want an accurate counter so you can locate data as quickly as possible.

The trend these days is away from

cassettes, because they're slow. The tape must be run through before the data you want can be retrieved, which can take 10 to 15 minutes for a single item. Less and less serious programming is being done on cassettes.


Immediate information

Business applications in particular, as well as professional applications, require speedy random access to data. Some professional applications do, too. For example, if a customer calls about an order, you'd want to be able to enter the customer's name and have the computer give you the date the order was placed, what was shipped and when—while the customer is on the phone. In this situation, a floppy disk is for you. It can do the job within seconds. Most programming available now is on floppies.

Floppies vary in their capability—storing data on a single side or both sides. A floppy can load up to 20,000 bytes of data a second versus 600 bytes a second for a cassette. So-called single-density floppies can store the equivalent of 60 to 150 pages on a side; double-density floppies, twice that much. Floppies come in 5¼-inch and 8-inch diameters, the larger size holding substantially more data.

Single sided, single density 5¼-inch floppy disks run about \$25 for a box of 10—8-inch double-side, double-density floppies, about \$40. You need extras to copy files in the event one is damaged.

If you work with a limited amount of data, a single disk drive should do the trick. But it enables you to use only one disk at a time. Editing long texts, for instance, would mean inserting one disk, pulling it out and inserting another, pulling it out and inserting another—a distraction. Probably you'd be better off paying more for a double disk drive. Moreover, copying disks is easier with a double disk drive. And if one drive



The Davong DSI-501 fits into the second slot of the IBM Personal Computer to provide up to 5 MB formatted (6 MB unformatted) storage for \$1995. The DSI-514 provides up to 12 MB formatted (14 MB unformatted) storage for just \$2695*.

\$1995.* PLUG IN HARD DISK FOR THE IBM® PERSONAL COMPUTER.

One low price buys you the expanded storage, speed and reliability of a Winchester technology hard disk system. Both the DSI-501 and the DSI-514 support IBM DOS®. Full software support includes an installation program and complete diagnostics.

The DSI-ASYNCRAM provides 64K RAM, expandable to 256K with parity, and 2 serial I/O ports on one card. Select the option and save space as well as dollars. The price of \$495* includes extensive software for flexibility.

More low-priced expansion options. Our wide selection lets you mix and match products to fit your needs and your pocketbook.

Choose the DSI-64K, DSI-192K, or the DSI-256K fixed RAM cards with parity. For powerful upgrades, select the DSI-EX64K—a 64K RAM card that easily expands to up to 256K with the addition of individual memory chips. Prices start at \$299*. Also available is the DSI-ASYNCRAM, a dual port serial I/O card priced at \$199*.

Expand your IBM Personal Computer for a lot less money. Take this ad to your local computer retailer and ask for products by Davong.

 **DAVONG
Systems, Inc.**

1061 Terra Bella Avenue
Mountain View, CA 94043
(415) 965-7130

*Manufacturer's suggested retail price. Includes all required components.
IBM Personal Computer and IBM DOS are registered trademarks of IBM Corporation.

"The computer is one of the few purchases that gives the consumer tangible evidence that he made the correct decision."

malfunctions, you can continue operating with the other.

At the low end, you have single disk drives capable of accessing data from a single-sided disk. They run about \$400. A double disk drive that can accept double-density disks costs about \$1000. Superior quality drives can exceed \$2000. Better reliability is the benefit here, since a drive is a common source of malfunction.

You always want more

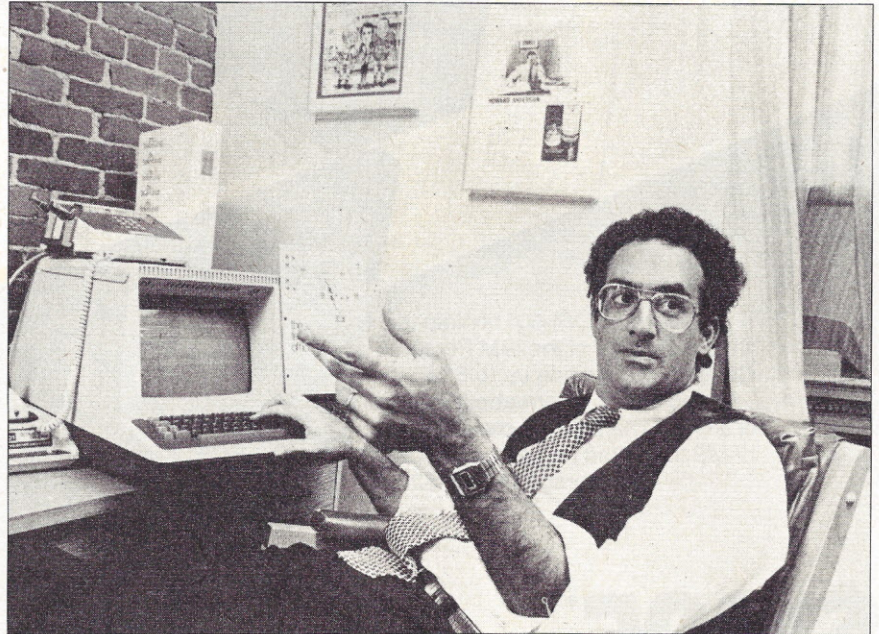
Probably you won't need more storage than floppies can provide, but if so it's available via hard disks. Built into a computer, a hard disk contains up to 40 million bytes of data. Typically it's powered by what's called a Winchester drive. The package can cost a couple of thousand dollars more than a floppy system. "Yet people always seem to want more memory, or more powerful microprocessors and more sophisticated programs on their personal computers," says Venture Development's Tim McMahon. "I believe hard disks are the wave of the future."

● *Is the keyboard easy to use?* Some keyboards are easier to use than others because of the way keys are arranged. The aim is to locate all keys within convenient reach. A small amount of difference can create a grating annoyance.

Most important is location convenience of the cursor-control keys, the control key and the escape key. Ease of access—speed—is the consideration here.

"The location of the delete key can pose a danger," warns Phillip Good, consultant and author of *Choosing a Word Processor*. "If it's adjacent to a commonly used key like shift, you could lose a half-hour's editing as a finger hits the wrong key."

Check whether there's "key-bounce," a tendency to produce two characters when the key is depressed once. This can really slow you down. The small size of some keyboards



Yankee Group's Anderson: I believe \$4000 is an optimal investment with current technology. You can accomplish 90 percent of almost anything you'd want. You can get 95 percent for \$8000, and 100 percent for \$20,000.

prevents you from typing quickly. So you're forced to hunt and peck, a distinct disadvantage for a personal-computer user intent on large amounts of word processing, but possibly not a consideration if accounting is the computer's central purpose.

● *What kind of monitor?* For casual use, save your money and buy a personal computer that hooks into your TV set. Potential disadvantage: an image that isn't as sharp as a computer monitor.

The admirable monitor

If your requirements are limited to computing, a small monitor, several inches square, should serve admirably. Word processing or work involving columns of figures calls for an 80-character-wide monitor. Most computer users are happy with a monitor 25 lines high, about a third of a page.

Compare monitors and you'll see that some are much more readable than others. A poor quality monitor means mushy characters and odd,

hard-to-read typefaces. Better monitors give you crisp, clear characters with typefaces more like those you see in newspapers and magazines.

If you work with a lot of text, you'll want a monitor that displays both upper- and lowercase letters, because an all uppercase format is harder to read. All uppercase is adequate if you work mainly with numbers.

You can choose monitors with white characters against a charcoal background, green against charcoal or full color capability. As you might expect, full color costs several times more, and you'd need it only if you do a lot of work with graphics.

If possible, get a monitor with a fast refresh rate. This means characters appear and disappear as soon as you hit the appropriate keys. When characters are slow to fade, especially as you scroll up or down, your eyes can become fatigued in minutes.

● *What kind of printer?* Because it
(continued on page 185)

Let's get personal...

try out the in-stock selection of Heath/Zenith microcomputers, peripherals, accessories and software.

Now available at your nearby Heathkit Electronic Center, or through the Heathkit mail order catalog.

You get more with a Heath/Zenith personal microcomputer system! We offer:

1. Proven high-performance hardware: Thousands of our microcomputers prove themselves daily, in the field.

2. Vast software library: Three operating systems (including CP/M), languages, word processors, an electronic spreadsheet, versatile utilities and the 500-program Heath Users' Group software library.

3. Self-instruction courses: Evaluation and programming courses from Heathkit/Zenith Educational Systems.

4. Service support: Before and after the sale – consultation by phone, carry-in service by trained technicians.

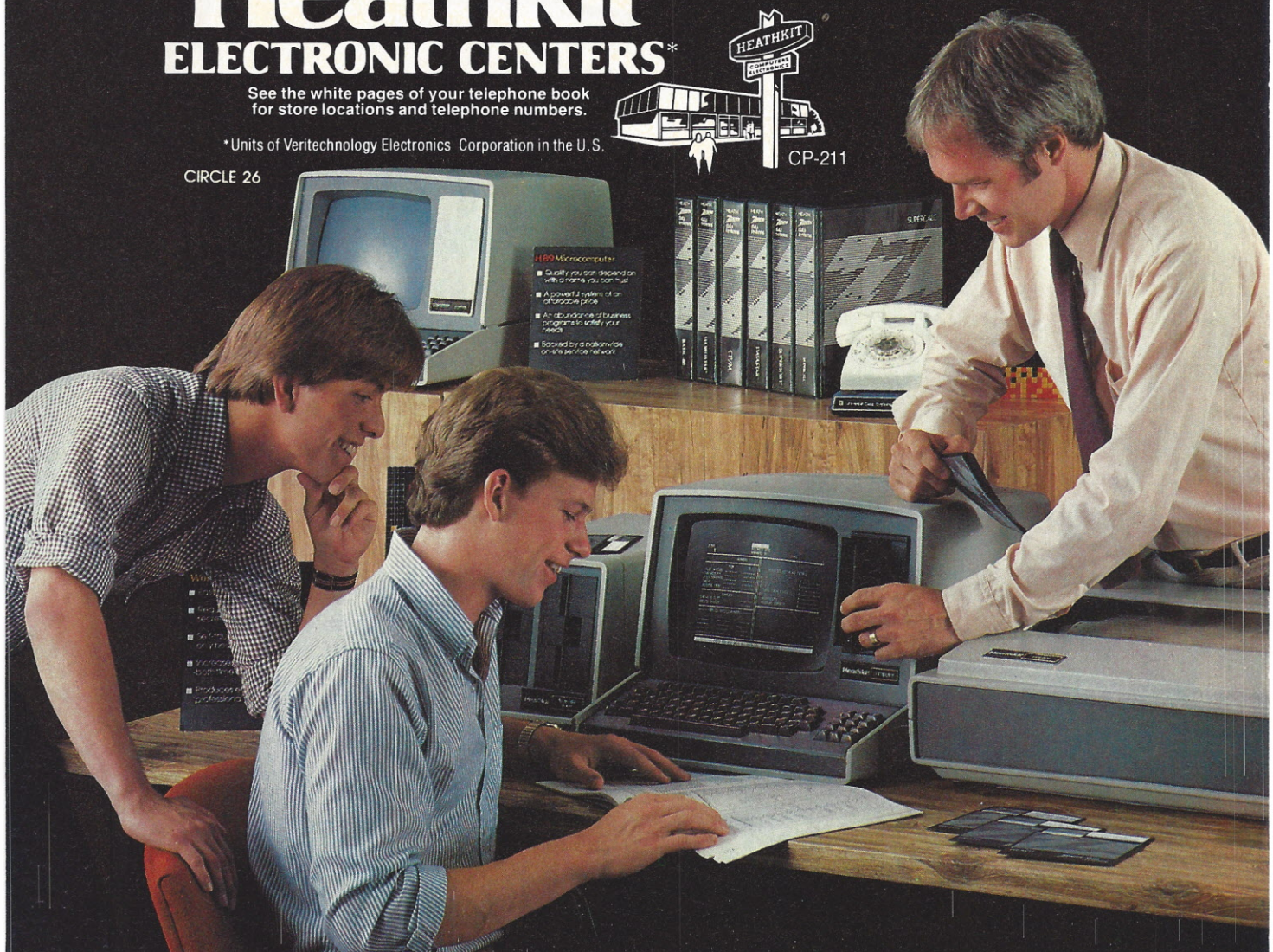
Test run one of our microcomputers at any of the more than 60 convenient Heathkit Electronic Centers in the U.S.

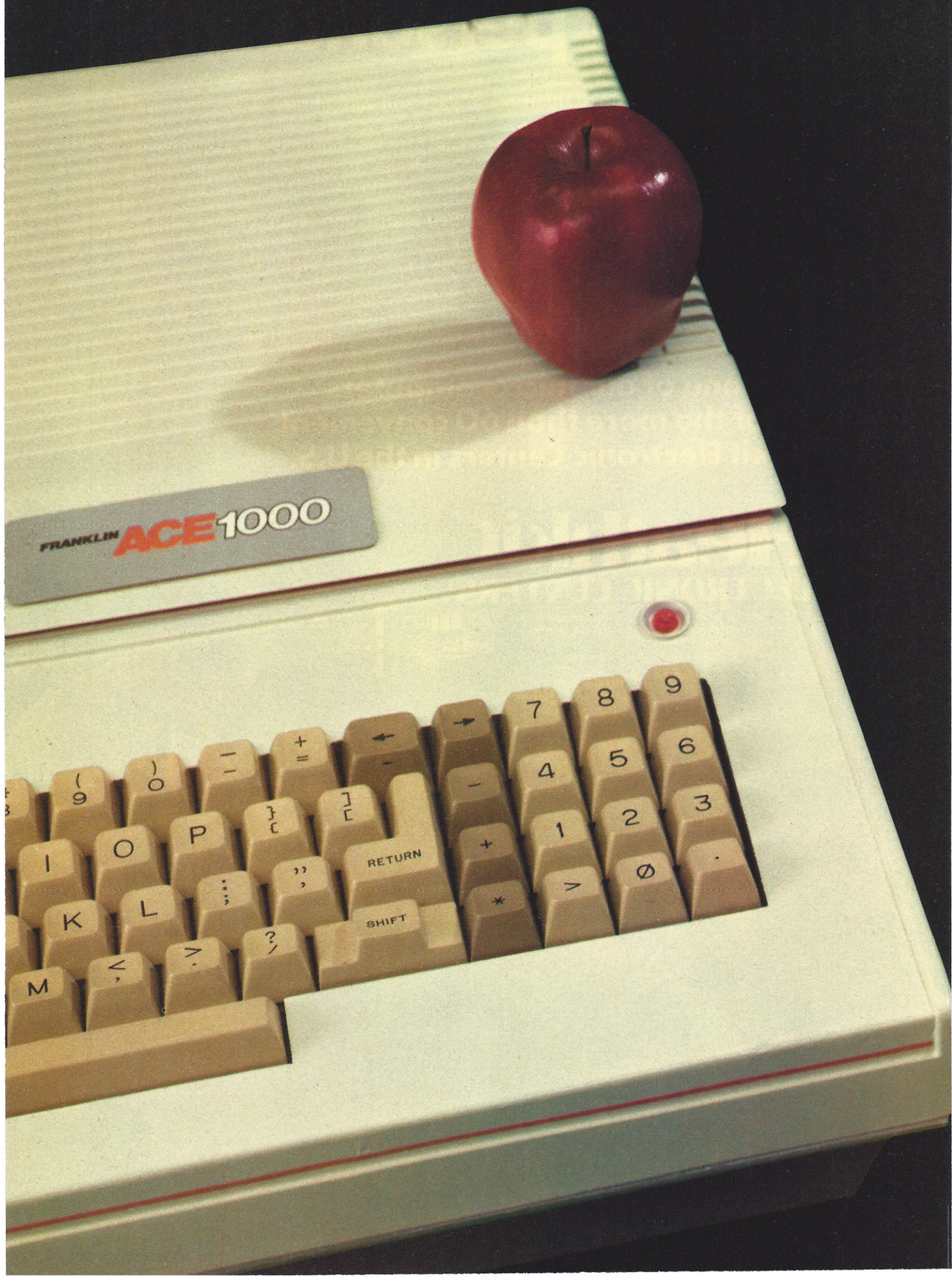
Heathkit[®] ELECTRONIC CENTERS^{*}

See the white pages of your telephone book for store locations and telephone numbers.

*Units of Veritechnology Electronics Corporation in the U.S.

CIRCLE 26





FRANKLIN **ACE** 1000

THE BEST DEAL IN TOWN!

THE FRANKLIN **ACE**1000

You just can't beat an ACE. Especially the Franklin ACE 1000. It's the professional personal computer with all the trump cards—it costs less, it includes 64K of RAM, upper and lower case, a numeric pad and VisiCalc® keys, all features not found on the Apple® II.

Peripherals that work with the Apple II will work with the Franklin ACE 1000. Programs that run on the Apple will run on the ACE. Totally Apple compatible . . . yet, so much more!

The Franklin Ace 1000—price, power, quality, reliability—the best deal in town. Call or write today for the name of your local authorized Franklin dealer.



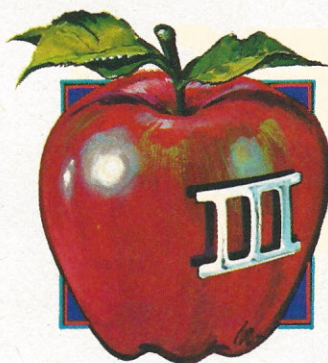
FRANKLIN
COMPUTER CORPORATION

7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

Franklin ACE is a trademark of Franklin Computer Corporation
Apple is a registered trademark of Apple Computer Inc.
VisiCalc is a registered trademark of Visi Corp.



CIRCLE 33



Turn your Apple* III into an Orchard



With software from Quark™ Engineering

Quark Engineering brings you software specially designed for your Apple III. Easy-to-use products that dramatically increase your system's capabilities. And **your** productivity.

You start with Word Juggler™, the most easy-to-use word processor available for the Apple III. Word Juggler is written in assembly language. And comes with special keyboard templates to label important functions.

Word Juggler retails for \$295. Form letter and simple mailing list capabilities are included free. If you want even more capacity, you can interface with Apple's Mail List Manager for an additional \$35.

Need to check your spelling? Add Lexicheck™. A high-performance spelling checker with a 25,000-word dictionary. You can add your own words. And get more accurate documents, without a lot of proofreading. The price? Less than a penny a word. Only \$195.

You can even send text from Word Juggler to computerized typesetting equipment. All you need is TypeFace™. Interface software which cuts your typesetting costs and eliminates re-keying errors. \$175.

Finally, there's TranScribe™. A spooler designed especially for hard disk drives. TranScribe lets you use other computer functions while you're printing. And it's compatible with most Apple III software. \$125.

There's much more to tell you about Word Juggler, Lexicheck, TypeFace and TranScribe. See them at your local dealer. Or contact us today. We'll help you turn your Apple III into an orchard. And from then on, you'll find easy picking.

Quark Engineering
1433 Williams, Suite 1102
Denver, CO 80218
(303) 399-1096

Quark

*Apple is a registered trademark of Apple Computer, Inc.

See us at Applefest / San Francisco, Booth #529

CIRCLE 163



Hand-Held Computers: More Than A Curiosity

Hand-held computers have often been dismissed as glorified calculators. But now, as these small machines are being used for everything from inventory to quality control, they're taking their place among the computing giants of the past few years

by Richard D.R. Hoffman

A small revolution is underway in the personal-computing world as hand-held, or pocket, computers, are communicating with desktop systems.

While small correctly identifies the physical size of these miniature mainframes, they are, in fact, equivalent in computing power to much bigger machines of only a decade or so ago. Today, people are finding low-cost portable power to be effective in remote data collection and in applications that extend the reach and effectiveness of personal computers.

The applications—many not yet available to the public—include inventory- and quality-control systems, sales, cost accounting, financial systems, measurement, and scientific and engineering systems. Hand-held computers from Hewlett-Packard and Panasonic already are in place in some applications interfacing with a desktop system. Others from manufacturers such as Radio Shack and Sharp, (which manufactures the Radio Shack hand-held computer as well as its own) expect it won't be long before they, too, see similar applications.

Growth of hand-held computer use has been swift, even for the fast-paced technical world. Richard Nelson, president of the non-profit Per-

sonal Programmers' Club, Inc. dates the birth of the personal-computing industry at January 1975, when the HP-65 scientific calculator was introduced. Nelson's organization began a year earlier and now boasts 5000 members from 55 countries in 35 chapters around the world. He touts it as "the oldest personal-computing users' group in the world."

Nelson takes a somewhat chauvinistic attitude toward definition of the personal computer. "It's something you can carry with you, 24 hours a day if you want, something that becomes part of your everyday activities." Although most of us would define "personal computer" in broader terms, the hand-held units currently available do function as Nelson describes. And more.

Hand-held computers began communicating in the minicomputer and mainframe environments. At the time there was a lot of that kind of hardware in place, and the programmers available were familiar with minicomputer and mainframe environments, but not with personal computers. Hand-held data terminals, first cousins to hand-held computers, had been used in remote data-collection applications for years prior to the advent of the pocket computer. Such terminals are usually programmed for dedicated applications as pure one-way data-entry devices with limited peripherals and little or no independent computational capability.

But the hand-held terminals have increased in sophistication.

An up-and-running application involving a Telxon model 787 portable transaction terminal and an IBM System 38 at Agnew Surpass, Inc. of Brantford, Ontario, Canada, is a good example of both hand-held data terminals' sophistication and their use with minicomputers.

Agnew Surpass, part of the Genesco Group, Inc., recently became a 325-store Canadian shoe chain in July when it acquired Dexter Shoes, a former competitor. Prior to that expansion, Agnew Surpass had placed Telxon 787s in 210 of its retail outlets for one-way communication of data for a variety of applications, including point-of-sale (POS), payroll, inventory control and order entry.

The investment of over \$1 million was seen at that time as more desirable than installing POS cash registers costing \$8000 to \$10,000 at each store. Before the choice was made, the company was experiencing incomplete and late computer runs of sales and marketing reports on Genesco's System 38 in nearby Cambridge, Ontario. Erratic mail deliveries, some taking as long as 10 to 14 days to reach Cambridge from the stores, and keypunch operator difficulties in reading illegible sales slips and summary sheets, caused Agnew Surpass to consider automating the system.

Richard D.R. Hoffman is a freelance writer who covers the computer and electronics industries.

“Growth of hand-held computer use has been swift, even by the standards of the fast-paced technical world.”

Using software developed jointly with Telxon, sales data from each store's receipts are entered daily onto the 787s through interchangeable French or English keyboards. The process now takes about 20 minutes, instead of the hours it took with a manual system, noted Jake Mulhaus, vice president and chief accounting officer for Agnew Surpass.

Smaller scale problem

Jim Kilduff, owner of James E. Kilduff, Inc., a 30-year-old produce wholesaler in Everett, Mass., wasn't talking in millions when he tried to solve his remote order-entry problem, but he wanted to save time. He bought a \$25,000 order-entry system from systems integrator New England Data Systems, Inc. That includes 18 Telxon 716 data terminals at \$450 each, an Apple II Plus with 48k of RAM, a Novation 1200-baud modem and an Epson MX-80 printer.

Sixteen of the greater Boston area supermarkets Kilduff services use the terminals to transmit their orders between 3:30 p.m. and 7 p.m. Each produce item Kilduff carries has a four-digit code that the customer enters onto the 716, along with the quantity desired, and then transmits over the telephone line via an acoustic coupler.

The system saves Kilduff and his two sons about six hours each day of manually transcribing telephone orders. Once the orders are in, the Apple begins processing and prepares the picking orders for the next day—important because the Kilduffs' day begins at 2 a.m. The Apple also prepares daily and weekly reports on sales and orders.

Kilduff says the only continuing problem he has had with the system has been a malfunction that causes the computer to go down when a customer dials it and makes a transmission error. “If they push the send button and don't have the machine turned on when it's in the coupler, or if they suddenly disconnect the cou-

pler immediately after calling in the orders, the Apple gets hung up,” Kilduff says.

So the Kilduffs have to constantly monitor the Apple to restart it and receive other orders. But that seems a small price to pay for the time saved and reduced telephone usage everyone on the system is experiencing.

It seems that remote order entry can certainly save time—and time, as they say, is money. That's why Tom Alires, branch manager of AMFAC Corp's drug wholesale operation, is installing a 24-hour-a-day system at a distributor in Indianapolis. Such a system has just finished testing in Albuquerque. This system uses hand-held terminals too—these from MSI Data Corp—connected to an Apple II over telephone lines. The Apple in this case serves as a sort of preprocessor for a mainframe computer. It prepares a disk that transfers the information onto tape for use with Burroughs batch-mode computers. The Apple doesn't have the capacity for the kind of processing AMFAC needs.

Praise for flexibility

Alires praises the system for its flexibility. “We have enough diagnostics built in so that we can recover all but a small percentage of garbled transmissions,” he says, a common problem with telephone-line transmissions. “The complete edit capability we have, by item and order, allows us to reconstruct an order file completely.” Salesmen also carry MSI units and can expedite an order from a new customer.

Controlling errors and saving time and money are the big selling points of the hand-held data terminals. But when it comes to applications that require computational capability, the hand-held computer adds that feature—as well as two-way communications with the host computer.

There's an analogy between the world of personal computers and hand-held personal-computing de-

vices and the world of minis and mainframes. Hand-held terminals and computers offer distributed data-processing capabilities to the personal computer, as does the intelligent terminal (or a personal computer itself) to the mainframe and minicomputer.

Like a smart terminal

But the data terminals function as “dumb” store-and-forward terminals with minimal computational and no processing capabilities. Having a hand-held computer, though, is more like having a “smart” terminal on a network, or a personal computer itself.

The analogy comes alive in comments from Kirk Gregory, director of engineering from Symons Corp. of Peoria, Ill., a large manufacturer of concrete forms and ties for the construction industry. Gregory is considering using the Panasonic hand-held computer with 4k of memory as a field-engineering tool. With it, branches and divisions worldwide could access engineering data, such as structural and beam analysis, from Radio Shack TRS-80 Microcomputer Model IIs via telephone.

“We set up the Panasonic HHC here in our office with its telephone modem,” Gregory says. “We put the Radio Shack II into host mode, transferring control of the computer to the peripheral, hooked the Panasonic HHC to it and a monitor, and watched the two of them talk to one another. We listed, ran and modified a program over the system.”

Gregory likes the portability of the Panasonic system, and its modular design. “The nice thing about it is you can buy it in steps,” he observes. “The HHC is about \$400, and then you can add peripherals to it as you go.”

Since Symons does a lot of rental business, Gregory says, the HHC “ultimately will be programmed for sales people to use for logistics and shipping purposes. With this system it's possible to do estimates and on-

Now NRI takes you inside the new TRS-80 Model III microcomputer to train you at home as the new breed of computer specialist!

NRI teams up with Radio Shack advanced technology to teach you how to use, program and service state-of-the-art microcomputers...

It's no longer enough to be just a programmer or a technician. With microcomputers moving into the fabric of our lives (over 250,000 of the TRS-80™ alone have been sold), interdisciplinary skills are demanded. And NRI can prepare you with the first course of its kind, covering the complete world of the microcomputer.

Learn At Home in Your Spare Time

With NRI training, the programmer gains practical knowledge of hardware, enabling him to design simpler, more effective programs. And, with advanced programming skills, the technician can test and debug systems quickly and easily.

Only NRI gives you both kinds of training with the convenience of home study. No classroom pressures, no night school, no gasoline wasted. You learn at your convenience, at your own pace. Yet you're always



backed by the NRI staff and your instructor, answering questions and giving you guidance.

You Get Your Own Computer to Learn On and Keep

NRI training is hands-on training with practical experiments and demonstrations. You don't just program your computer; you go inside it...watch how circuits interact...inter-face with other systems...gain a real insight into its nature.

You also work with an advanced liquid crystal display hand-held multimeter and the NRI Discovery Lab®, performing over 60 separate experiments. Both microcomputer and equipment come as part of your training for you to use and keep.

Computer Assisted Instruction

Your TRS-80 even helps train you. You receive 8 special lesson tapes in BASIC computer language. Using them in your microcomputer, you "talk" to it as you progress. Errors are explained, graphics and animation drive home key points. Within a matter of minutes, you'll be able to write simple programs yourself.

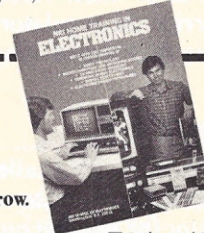


Training includes the TRS-80 Model III micro-computer, professional LCD multimeter, the NRI Discovery Lab, Computer Assisted Instruction programs and hundreds of demonstrations and experiments.

(TRS-80 is a trademark of the Radio Shack division of Tandy Corp.)

Send for Free Catalog... No Salesman Will Call

Get all the details on this exciting course in NRI's free, 100-page catalog. It shows all equipment, lesson outlines, and facts on other electronics courses such as Electronic Design, Industrial Electronics, TV/Audio/Video Servicing...11 different career opportunities in all. Send today, no salesman will ever bother you. Keep up with the latest technology as you learn on the latest model of the world's most popular computer. If coupon has been used, write to NRI Schools, 3939 Wisconsin Ave., Washington, D.C. 20016.



All career courses approved under GI bill.
☐ Check for details



NRI Schools
McGraw-Hill Continuing
Education Center
3939 Wisconsin Avenue
Washington, D.C. 20016

We'll give you tomorrow.

NO SALESMAN WILL CALL.

Please check for one free catalog only.

- ☐ Computer Electronics including Microcomputers
- ☐ Color TV, Audio, and Video System Servicing
- ☐ Electronics Design Technology
- ☐ Digital Electronics
- ☐ Communications Electronics • FCC Licenses • Mobile CB • Aircraft • Marine

- ☐ Industrial Electronics
- ☐ Basic Electronics
- ☐ Small Engine Servicing
- ☐ Appliance Servicing
- ☐ Automotive Servicing
- ☐ Auto Air Conditioning
- ☐ Air Conditioning, Heating, Refrigeration, & Solar Technology
- ☐ Building Construction

Name _____ (Please Print) Age _____
Street _____
City/State/Zip _____
Accredited by the Accrediting Commission of the National Home Study Council

173-102

"People are finding portable power effective in remote data collection and applications that extend the reach of personal computers."

the-spot sales quotations, as well as discover whether an item is on the shelf or back-ordered in order to set up delivery."

Gregory adds that he would have liked to use the Radio Shack PC-1 or PC-2 and keep to a single source. "But they tell me they're not yet capable of such applications and won't be for a year. And I don't have a year to wait," he says. Radio Shack has announced as RSS-232-C interface that would make it possible for the PC-1 or PC-2 to communicate with other computers. But the interface won't be available, a Radio Shack spokesman says, until January 1983.

Meanwhile, Randolph and Associates, a civil-engineering firm in Peoria, is using the Panasonic RL-H 1400 hand-held computer in conjunction with a Campbell Scientific CR-21 special-purpose computer in a study of the effect of sewer overflows on the quality of the Illinois River.

Dan Good, an engineer with the firm, explains that a sewer is equipped with a regulator—essentially a hole in the bottom of the sewer pipe—that allows effluent to drop to a lower-level pipe that transports the sewage to a waste-treatment plant. During storm periods, however, large volumes of water force the effluent to override the regulator and waste matter is discharged into the river.

Off for the week-end

The Campbell CR-21 is installed at 10 strategic locations along the sewer system to monitor the effluent quality and quantity, providing information that signals when corrective measures should be taken. Data from the CR-21 were formerly transmitted directly over the phone lines to a time-sharing service in nearby Morton, Ill. "But that became a problem," Good says, "because the time-sharing service shuts down over the weekend."

To accomplish constant monitoring, Randolph decided to use a

Panasonic RL-H 1400 with a resident 4k of RAM. The hand-held computer collects data from the CR-21's sensor and checks its batteries from a remote site via Panasonic's acoustic modem over the telephone lines. The data are then sent, again over telephone lines, via a 1200-baud Racal-Vadic modem that plugs into an RS-232-C interface, to the time-sharing service where graphs, flow tabulations and other reports are produced. Panasonic's Telecomputing 2 software module that plugs into the back of the RL-H 1400 controls the communications.

Going home in a briefcase

On weekends engineers monitoring the sensors take the Panasonic unit home with them in its custom briefcase. That also transports all the peripherals that make the application work: an extra 8k of memory, the RS-232-C serial interface, a 40-character thermal dot-matrix printer, a TV adaptor for graphic display and a battery charger. Good says the entire system costs about \$2300, including software.

"We're still writing software for the application," Good says. "We're just beginning to do software for other municipalities. We think the system is excellent for any kind of monitoring or quality-measurement application, and it's handy because it communicates over a standard phone line."

Panasonic also offers two other models of hand-held computers with 2k or 8k of RAM, as well as 4k, 8k and 16k memory modules, a BASIC compiler/interpreter and several other plug-in telecomputing, program-development and application modules, plus several other peripheral items.

Hewlett-Packard offers a similar array of peripherals and basic units, and likewise has its pocket computers involved in a variety of applications linking them to larger computers.

HP-41s are being used, for exam-

ple, in a quality-control role in a system developed by Cameron Computers of Rochester, N.Y., in conjunction with Xerox. Cameron responded to a new quality-control program Xerox is setting up with its more than 1500 suppliers of components and precision parts.

Communicate with ease

The program involves on-site quality-control reports from each supplier who decides to join the program. Suppliers submit their reports to Xerox for review and certification. Once certified, parts go directly from the supplier's production floor to the Xerox production line, saving Xerox costly incoming inspection.

Cameron's solution automates the program for Xerox suppliers. It costs about \$6000, including software, and uses a HP-41 with 2.2k of on-board memory, expandable to 6k, and the HP-85 personal computer with tape drive and printer. The system communicates through HP's recently announced HP-IL converter, which includes the interface to allow the 41C—as well as the brand-new HP-75 hand-held computer—to communicate with any of the HP Series 80 desktop models.

This system is currently in use at the Alliance Metal Stamping division of Alliance Tool Corp. of Rochester, the first Xerox supplier to bring it on-line. Don Fletcher, a quality-control manager at the plant, says the application has only been running about eight weeks, but there have been no difficulties with it in that time.

Fletcher explains that quality-control inspectors use the HP-41C as a hand-held data-collection unit on the Alliance production line. They enter dimensional data on manufactured parts. Then they bring the computers to an inspection laboratory where they dump their collected data to the HP-85 through the HP-IL interface loop.

Histograms, R-charts and X-

For top quality performance from your computer, use the flexible discs known for memory excellence. Now, buy a specially marked box of 10 Memorex® 5¼" mini flexible discs and we'll send you an additional mini disc FREE.

Features like our uniquely sealed jacket and protective hub ring make our discs last longer. And a soft inner liner cleans the ultra-smooth disc surface while in use. It all adds up to better performance and reliability.

Our proprietary high density media formulation and 100% error-free certification guarantee reliable performance in all single or double density applica-

tions. So for business, word processing, or personal computer applications, Memorex mini discs are sure to do the job. And we back them with a full year warranty to prove it.

So see your local Memorex distributor or dealer or call (800) 538-8200 (In California (408) 987-1893) today. Buy a box of 10 flexible 5¼" mini discs. Then send the coupon in the box to Memorex for your free mini disc. It's that simple.

It's a great way to improve your memory and get a big bonus in computer performance.

MEMOREX
A Burroughs Company

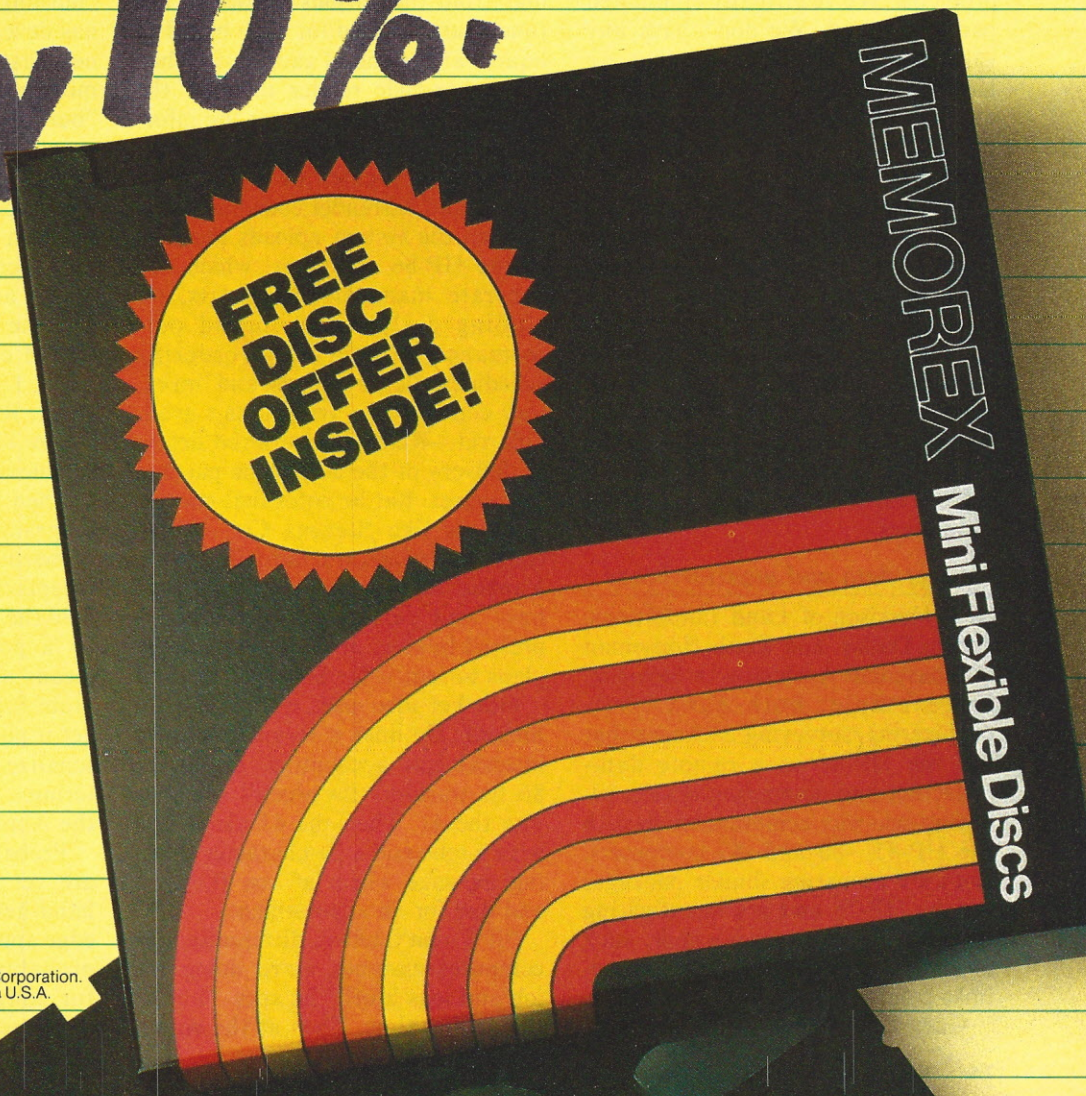
Improve your memory by 10%.

Dealer inquiries invited.

See us at CES Booth #731
McCormick Place, June 6-9.

© 1982 Memorex Corporation.
Memorex is a registered trademark of Memorex Corporation.
Offer ends December 31, 1982. Offer good only in U.S.A.

CIRCLE 29



PROFESSIONAL/ MANAGERIAL

“Having a hand-held computer hooked to larger computers is like having a smart terminal on a network.”

charts—all relating to a part's tolerances and quality—are then produced on the printer. After collecting and evaluating data from 26 separate samples on five components each from the production run, Alliance sends the information to Xerox for certification of the part.

“With this system,” says Fletcher, “we can establish the upper and lower control limits and fine-tune a particular part within the allowable tolerance band. This allows us to consistently produce parts of high quality. We have a quality tool that involves more inspection time up front but saves a lot of time that would otherwise be lost because of dimensional problems. We've virtually eliminated part reworking. We don't have any valid data or statistics yet, but we have observed an upward trend in quality and less downtime on the production runs due to quality-control problems.”

The availability of the HP-IL interface has spawned a lot of interest from systems integrators (people who put together a computer system designed for specific applications, like Cameron Computers) and consultants around the country. Many have developed software that works with the HP-IL to interface both the HP-41 and the newer, more sophisticated HP-75 with larger personal computers.

Collect data and monitor booze

Rick Harrison of Land Innovations, Inc. in Dallas, and Keith Houseman of Houseman Associates in Houston, for example, both have civil-engineering/surveying packages that use the HP-41 as a remote data-collection and computing device, allowing two-way communication with the HP-85, -86 and -87 computers. Both are preparing similar packages for the HP-75 and are investigating software for other professions, such as sales, that will allow similar uplinks from HP hand-held computers.

Gary Goelkel, of Profit Manage-

ment Systems in Fort Lauderdale, Fla., has developed a unique application for Dave Reilly, president and owner of Electro Data Systems. Reilly has developed a special pourer that fits on liquor bottles. The spout has a built-in microprocessor and light-emitting diode (LED) display. It can automatically monitor how many units of liquid have been dispensed from a bottle and how many times the spout is moved from bottle to bottle.

Goelkel developed software around this innovation, creating a system that uses the HP-41, the HP-IL and a HP-86 personal computer. With this system, managers can take readings from the various bottles in use (one pourer is used for each brand of liquor) at the end of each shift. They use a bar-code reader to enter the brand, and manually enter the information displayed on the LED display. They also enter the bar location, station and bartender code manually.

Then the system uploads the data to the HP-86 computer, which can generate management reports, including daily usage, brand performance, delivery and ordering schedules, liquor trends and inventory control. The system isn't available yet—Reilly has suffered delays in delivery of the chip to be put into the pourer. But he notes that concessionaires like Stevens Co.—which runs concessions at Churchill Downs, Yankee Stadium and several large bars and restaurants—have expressed interest in the system. Reilly plans to rent it for \$300 per month.

Goelkel also uses an HP-41 for himself. He links it to an HP-86 for internal cost accounting. Using the 86 he transfers the week's schedule into the 41. Then the 41 alerts him with a tone and a 24-character flashing message when he's on the road and due for an appointment.

“If I don't tell it differently, the computer assumes we're doing the job and logs it off,” he says. “I enter the ending time. Then at the end of


the day or week I transfer the data back into the 86, which then uses it for job costing. And I can still use the hand-held unit for computation without disturbing the program.”

Leaving the business nest

While most of the applications linking hand-held and larger computers today are in the business world, it probably won't stay that way. P.M. Weaver Associates, of Charlotte, N.C., has created a service that should let hand-held computer uses proliferate. Executive director Mike Weaver and designer Jim De Arres created an EPROM (Electronically Programmable Read-Only Memory) “burning” process for the HP-41 that has developed into a worldwide business that Weaver says has grossed \$1 million in just six months. (EPROM “burning” is the process of writing a program onto the device.)

Weaver has a patent pending on the process his Hand Held Products Division is offering. The process allows users to develop programs on the HP-41 and then send those programs over the HP-IL to any of a number of CP/M computers, including the Osborne 1, the IBM Personal Computer, the Radio Shack Model II and the Xerox 820. That computer then reproduces the program on disk.

Then Weaver's system reduces the program to EPROMs. Sixteen k can be burnt onto three chips. A special receptacle attaches to the HP-41 to hold the chips, which expand the unit by a possible 32k of ROM. This means anyone who can write a program for one of these computers can get it put into a module to truly personalize his machine. Panasonic is offering a similar development tool for the Apple II for use with its HHC.

Probably thousands of applications are yet to be thought of for small, hand-held computers. The leading-edge applications mentioned here will probably not remain leading-edge for long as the small revolution continues. 

"My computer helped me write The Final Encyclopedia. I wouldn't trust anything less than Scotch® Brand Diskettes to make a long story short."

**Gordon R. Dickson,
Science Fiction Author,
Minneapolis, Minnesota**

Gordon Dickson: a small businessman whose product is his own imagination. He's written more than 40 novels and 150 short stories; his newest work is *The Final Encyclopedia*. He uses his personal computer and word processing software to maximize his production. All his words—his product—are stored on diskettes. He calls up sentences and paragraphs on demand, and gets more rewrite out of the time available. So he depends on Scotch diskettes to save himself production time.

Dependable Scotch media can work just as hard for you. Each Scotch diskette is tested before it leaves our factory, and certified error-free. So you can expect it to perform exactly right.

Scotch 8" and 5¼" diskettes are compatible with computer/diskette systems like TRS-80, Apple, PET, Wang and many others. Get them from your local 3M distributor. For the one nearest you, call toll-free: 800/328-1300. (In Minnesota, call collect: 612/736-9625.) Ask for the Data Recording Products Division. In Canada, contact 3M Canada, Inc., Ontario.

**If it's worth remembering,
it's worth Scotch
Data Recording Products.**



Cover art by Michael Whealen, courtesy of Ace Publishing Co.



3M Hears You...

3M

CIRCLE 18

When Personal Computing Becomes Impersonal

That line is drawn when the institution, not the person, makes the decision to compute. When we asked personal-computer manufacturers about their own computing, we found that it's not all personal

by David Gabel, Senior Editor

The shoemaker's children are the ones who have no shoes. "I'm one of them," says Carrol Leu, vice president of data processing for Tandy Corporation, the manufacturer of the TRS-80 Microcomputer. "When it comes to getting something programmed on my mainframe computers, I take the lowest priority. That's OK; I don't want to waste the time on that computer when my Model III does VisiCalc for me."

Leu is one top executive in a personal-computing company who understands the utility of personal computers—what they can do well, and what they can't do. "We use them all over the place here," he says. "I'm all for it. Even if I weren't at Tandy, I'd be for it. It's the way to go."

Leu is unusual. He understands the difference between using computers to accomplish personal goals—whether they're business-oriented or not—and using computers for the goals of the organization. The former is personal computing. The latter could be called institutional computing.

There is a big difference. When people do personal computing they're operating with high efficiency because they are using a productivity-enhancing tool as they want to use that tool. There's no coercion, so they

learn all they can about that tool to get the most they can from it. They say things like, "Well, I'm going to use my computer today to get my budget done early." And they will get it done early, and then move on to something else. That's productivity. That's personal computing.

Yeah, but . . .

Too often, though, something else happens. Organizations impose equipment from above. They tell the employees that they will use a particular style of work, or a particular kind of activity, or a particular kind of tool. Some organizations even decide what kind of equipment people at different levels in the organization

will have—down to the chairs the people sit on, whether the chairs function well or not. That's institutional sitting. And if the organization does that with personal computers, it has to be institutional computing. Then people are prone to say, "Oh, darn it, I have to learn how to use this thing. The boss said I have to, and I know what will happen if I don't."

Radio Shack's Leu seems to understand the distinction very well. He has a unique solution to the old problem of the unresponsive data-processing department. "You know, you've got a lot of users out there, and you just can't really service them all with your mainframe. Some of the smaller users can wait and wait to get help. Well, what I do is send a junior programmer out, if the application is a relatively simple one—one that the personal computers can handle. The programmer can write an application for a Model II that can take care of the user's needs. That solves the problem." So Leu uses his computing institution—his data-processing department—to further personal computing inside Radio Shack.

Leu also uses a personal computer himself—in this case a Radio Shack Model III—to do his budgeting. "I used to spend weeks getting the budget together, trying to get stuff to balance and such," he says. "Now I



Apple's Phil Roybal: I was one of the first managers to move toward computerization in my department.

change one entry and the computer makes all the changes that come from that. Why I can justify my computer with just that one package. But then, too, there are some things that I work on that I just wouldn't want anyone else to see. I can use the computer for that, too."

That's personal work. So Leu is doing personal computing. The only institutional aspect of the work he's doing is the brand of hardware being employed. Some concessions, after all, have to be made to a company that makes computers. But Leu also helps people with their personal requirements. And he sends people out to help them find solutions they can use on their personal computers. The personal and the institutional each work in their proper sphere. People and corporation work together.

Ed Esber says people at VisiCorp work that way. Esber, a product manager for the VisiCalc publisher, says he uses personal computers, mostly at home. "In product marketing," he says, "it's tough to get away from the phones and the meetings." So he and others have been able to justify keeping a personal computer at home to work away from the brouhaha.

Esber, who was the eighth or ninth employee at VisiCorp, which now boasts about 150 employees, catalogs the uses personal computers are put to at the company.

"I use VisiCalc for sales forecasting, pricing and gross-margin calculations," he says. "But the most used program here is VisiSchedule. We use it in the marketing department to do manpower loading and budgeting.

"The financial guys use personal computers for accounts receivable 'what-ifs' and stuff like that—stuff like budget projections vs. actual experience. We do a 12-month plan every six months here, so everyone uses a VisiCalc template to do that. Of course the secretaries use a variety of word-processing programs.

"Almost every professional here

has a personal computer on his desk. That's almost company policy. We believe our products are productivity enhancers; that's how we use them."

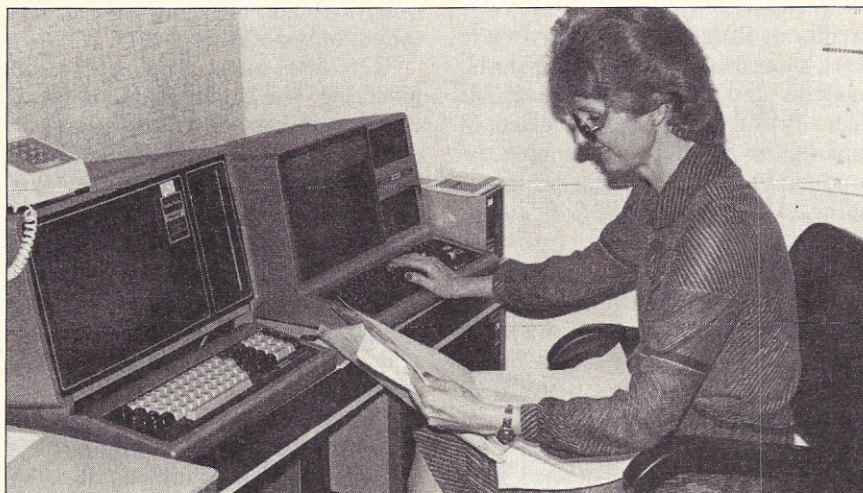
Esber says that about six months ago most of the computers at VisiCorp were Apple IIs, but now the IBM Personal Computer is gaining. That could cause a problem of file compatibility between the machines, but Esber says it hasn't so far, because, "different departments have different pockets of machines. I suppose the tech guys could fix the file-compatibility problem if they need to, but so far there's no need."

VisiCorp's people use personal computing to help in personal activ-

puting for themselves that make this fit into the category of personal computing.

But when clerks make up the next payroll, it's all for the company, except for the clerk's own pay, of course. VisiCorp does its 150-person payroll another way.

"Actually, the Bank of America does our payroll," says Esber. "Other institutional needs are handled by minicomputers. We have a data-processing department that runs an HP-3000, and that's used for things like order processing and the like. Much of our product development is done on a VAX 11/780 (a computer from Digital Equipment Corp-



Lynn Gibson is one of the programmers charged with keeping Radio Shack's Store Operating System, a network of retail stores connected to headquarters, up and running.

ities. When a financial type sits down to decide what will happen if receivables age past 60 days, it's a very personal thing. He has to make his assumptions very carefully, decide what weighting to give certain factors, and determine what the effect of various possible corrective remedies might be. Same thing with a product manager who's trying to decide when the new package will make it to market. These people are all using the computer to help them in their jobs. The result will help the company, but it's the people who are doing the com-

putation) using cross assemblers, (which are programs that turn personal-computer code into VAX code for running). And much of the documentation is written on the VAX. Of course, lots of the terminals on the VAX are personal computers. The folks use them as intelligent terminals."

The other way

It can be different. Even in the personal-computing companies, the organization can turn out to drive the

people, instead of having things the other way around. It's too bad when that happens. The goals of the institution are surely met, but what about the people?

IBM is the company in the computer business that's looked on as the leader in institutionalizing the individual. People in other companies love to tell about singing the IBM fight song at company sales meetings. And the requirement to wear white shirts, dark suits and conservative ties is legendary—but still carries over today. Surely, the IBM Personal Computer has changed that?

Well, maybe it's beginning to. Mike Pruitt is a professional electrical engineer who works in the IBM facility at Raleigh, N.C. They make data-communications terminals, modems and other communications gear. Pruitt doesn't get involved in making the product or in running the production lines. He keeps the plant going. He uses an IBM Personal Computer.

"I work with the high-voltage systems here," says Pruitt. "It could be the air conditioning systems, some control system or something like that. I had the opportunity to cost-justify a computer, and so we got one. We got one about three months after they were announced." (We got one? Who got one? Is this personal computing?) "There was only one computer in facilities engineering," Pruitt continues. "I was the coordinator of the effort to get the personal computer here. I cost-justified the one, and now our function has been able to justify another."

"I use VisiCalc or IBM advanced BASIC. For example, I wrote a materials-estimating program. When we want some contract work done we get bids from various contractors. Then we can check the contractors with this program. We can scroll all the materials past on the screen and add or delete as needed. That's after we've accessed a file and keyed in the labor costs and things like that. The

program is such that the particular user just puts in a data disk and turns the switch. The program does the rest for him. So we can check the bids the contractor submitted, using this program.

Energy audits

"We're also doing audits of our bills—electric, water and gas. We used to have a girl auditing the bills as they came in. So I wrote a program in BASIC that goes through the list of things on the bill, and asks questions as you go through it. It's easy to update that way. We have so many utility bills that it was taking 180 hours per year just to audit the bills that came in. That function is now taking only about 36 hours.

"I'm also using VisiCalc in engineering. I've compiled a long list of all the breakers and their ratings in all the substations at the plant here. Now we have a Series/1 (an IBM minicomputer) system that monitors the power demand on the substations. I put those figures into the VisiCalc program that takes the ratings and compares them with the highest demand. It tells me the loading on the transformers.

"I can use that too, to predict the demand that a building will use. We have company standards for the amount of power a building will use depending on the type of activity in areas of the building. We use two volt-amperes (the product of the current delivered and the voltage at which it's delivered, a measure of electrical energy) as the lighting load in an office area. There are other factors for other type areas, like computer rooms, drafting rooms and such. We can change those figures if we have reason to. Then we put all this into the VisiCalc program, and it will figure out what the total load and energy delivered, in kWh (kilowatt-hours), for a new building will be. Then we use that figure for our contract with the power company.

"I've fixed the program so I can

change the figures in one block of the program, and all the dependent variables in every other block will change, too. We brought the power company officials in here and showed them how the system worked, and they were impressed. So where before they would estimate how much power the building would use, now they use my number. It's that close to the actual experience we've had.

"We do a lot of things that are just repetitive, too," Pruitt continues. "And the secretaries also do word processing."

If Pruitt didn't keep saying "we," you'd almost think that it was "his" computer, and not the company's, or his "functions." He and his contemporaries probably don't even think of it on those terms. Wouldn't it be great if they did—if Pruitt called it "my" computer?

Not the only one

He's not alone, though, even in the personal-computing companies. People use their computers for themselves. And they do very well. But the institution keeps getting involved. They keep saying there are no typewriters; that's how much we think of the personal computer. Perhaps what they should be thinking about is how different their lives are since the personal computer.

Consider the case of Diane Le Bold. She's the editor of *Power/Play*, a publication of Commodore International for users of the VIC-20 computer. She wants to use her computer to do word processing on the stories that will appear in her magazine, and then send the stories directly to a typesetting shop in St. Louis where they will be made into a form suitable for photo reproduction and composition into a magazine. She can't.

"You'd think," she says, "that with all the programmers we have around here, with all the expertise, it would be possible to do that. But it apparently is not. There's something about the way the characters are sent from

***"I don't want to waste time
on my mainframe when
my Model III does
VisiCalc for me."***

the Commodore 8032 to the computers in the typesetting house that makes it so those computers don't understand what is being sent. The guys here don't seem to know what it is, and I sure don't."

But she uses a personal computer for word processing anyway. It's just that after she does that, a paper copy of the story goes to the typesetter where it is re-keyboarded—a colossal waste of time and money. That's too bad. (That used to happen at *Personal Computing* magazine.) Still, personal computing has helped her do her job better. No doubt about that.

Lots of people at Commodore use personal computers. Indeed, this is one of the companies where the folks are proud of the fact that there is only one typewriter in the place. "I don't know why we have it," said one. "I guess it's just so we can say we have it." What do the people at Commodore use their personal computers for? Just about what every other person who has a personal computer uses his for. They use them for word processing, for planning, for budgeting—in short, the people at Commodore and at other personal-computing companies use the computers as they would expect their customers to use them. They do more besides, but then it starts getting institutionalized.

Commodore just established a bulletin board for owners of its computers. The board is provided in cooperation with CompuServe, located in Columbus, Ohio. To use the bulletin board, a Commodore owner who gets a CompuServe subscription by buying a Commodore modem, merely calls the CompuServe number and asks for the Commodore bulletin board. Then he has access to news about the company and its products and some other helpful information. In particular, users can ask the company for help and get it the next business day. That's where Jeff Hand comes in.

Hand built the bulletin board as

part of his job at Commodore. He's the one who makes sure the bulletin board is accessed every morning to see what questions are there. Finding a question, he directs it to the appropriate person and makes sure the answer is back onto the board so the user can call and get the help he needs.

Long hours

"It took me a lot of hours—14 to 15 hours every day—just getting this thing off the ground," says Hand. "Now it's a lot easier. I've got a thousand pages on the network. Users can get answers to their questions, and so



VisiCorp's Ed Esber: Our products are productivity tools; we use them that way.

can our reps. They ask a question and get an answer the next day."

Apple Computer says it invented the personal computer, and it's probably the most celebrated of the personal-computing companies for having its employees use personal computers. But the way that all happened shows that Apple isn't into computing yet. Phil Roybal, who's the manager of communications programs ("I tell the company's story," he says.) explains how Apple got its people using personal computers.

"Two years ago, Scotty (Mike

Scott, then president) sent out a letter. In fact it was dated Feb. 1, 1980. It said that by January 1981 there would be no more typewriters in the company. It said that we believe the typewriter is obsolete, and we're going to live by what we believe. I don't really know how many people were using Apples at that time, but I suspect it was about 5 to 10 percent of the company.

"You see, there wasn't even a decent word processor for the Apple until 1979. The first one I used was called 'Doctor Memory.' It was terrible for what I wanted because it was a line editor, not a character editor. But it did the job. It was really for editing programs.

"Then Paul Lutus came along with Apple Writer and it was possible to replace typewriters with Apple computers. I was one of the first managers to move in that direction."

Roybal says the people who work for him use the Apple III now for their word processing requirements. They write everything that is said about the company. He personally uses the computer for budgeting and planning. He also uses it for electronic mail—there's an E-mail system, he says, for the entire company—database access and graphics. "I do a lot of speaking all over the country," Roybal says, "and I use the graphics for that." Apple has an incentive program called Loan/To Own. Employees who meet certain requirements can get an Apple II on loan. After a year, they own the computer.

Roybal may not be the typical user of a personal computer, working as he does with words so much. But there are others inside Apple Computer who are just like the average manager one would find in any company around the country.

Take John Butler, for example. He's the manager of national accounts—companies like General Motors, which might make volume buys of personal computers to provide them to people in the corporation.

"I can use the computer to predict the electrical demand that a building will generate."

MEANWHILE...AT PERSONAL COMPUTING

While personal computing may be a little impersonal at the companies we talked to for this story, *Personal Computing* magazine doesn't deserve any kudos for leading the new wave in computing either.

The problem at *Personal Computing* has been an institutional one all along. We need to use the computers primarily to get the material we will publish typeset. Yet we haven't enough computers to get the job done. This manuscript was written on an Apple II Plus with 64k of RAM, one disk drive, a Videx 80-column board and a soft switch to move from the Apple display to the 80-column display. But if I hadn't bought this computer myself, this story would likely have been done on a typewriter.

Presently, *Personal Computing* is trying to decide what equipment it will use to fully computerize its staff. That is, the institution is attempting to define equipment that it will, in effect, issue to all its people. Like Apple Computer, *Personal Computing* has been enjoined to get no more typewriters.

The nice thing about hardware, though, is its very versatility. Once it's in the shop, people start to use it. In fact, the few computers we have at the magazine (four: one for administrative work, two for magazine work, and one used mostly in the circulation effort) are in constant use. One of the two used for the magazine is almost always employed to write or edit stories, and the other alternates between those functions and data communications with our West Coast office. So the people at *Personal Computing* are familiar with the hardware. But there is no one who says, "my computer." When there are enough computers, and the people really are able to use them, then the computing should become personal.

Then we will have shoes, too.

Butler uses his computer to write his business plan. He has both an Apple III and a II on his desk. "The II is for electronic mail," he explains, "for sending documents over the telephone to other offices. But I primarily use my III for document creation and planning. For example, in doing this business plan I'm working on I had to do a lot of text. There are graphics also, for things like trends, discount recommendations, and so forth.

"I use Quick File as a data-base manager. I can keep the accounts by SIC (Standard Industry Classification) codes. My secretary does a lot of work with PFS. And I do financial modeling, too. When I did a point-of-purchase plan, for instance, I had to do a lot of 'what-ifs.'"

Butler says he's more fortunate than many businessmen, who don't have the time to learn personal computing. "I'm a mid-thirties manager who's figuring this out. But I'm a little farther ahead than lots of guys, because I work for Apple. They help you here. For example, when I came on board I took an Apple Writer II course. That's the last course I took. I taught myself Apple Writer III, and VisiCalc, and Quickfile. I could do that after I got the first course. I just take the computer home when there's something new to do, and figure it out and do it. It's kind of fun."

Not alone in providing help

Butler says Apple isn't alone any more in providing its people with help in learning computing. "Lots of companies are doing that," he says. "They provide what can be called information centers, with lots of different computers in them, so people who are interested in the computers can come in and learn something about them." Butler has experienced the phenomenon in his dealings with large corporations.

Yet if computing can be made easier with such management strategies, it still takes personal work. "Even

though this is the place it is," says Butler, "computing was kind of terrifying at first. We have so many computer jocks around here that it's ridiculous. They will help you, but you really have to put your own time into it. I did, and I'm glad, because I am so much more productive."

It's probably fair to say that many, if not all, of the people inside the companies in the personal-computing industry know how to use their personal computers to make them more productive on the job. But in addition to that, they also know the limitations of their machines.

They're just like cars

These folks are with their computers like people in the automotive industry are with their cars. People who work for the automobile companies buy their cars—they get them at a substantial discount, of course—to perform a specific purpose. The purpose can be one or more of several possible, but the people doing the buying get the vehicle that will accomplish the task at hand. If it's moving the family around, it's a sedan. If it's commuting to work, then often it's a small car. If the vehicle is to be used in the course of work—moving parts and material, or people, from one plant to another, for example, a purely institutional application—then the vehicle purchased will be one that can fulfill the goals of the institution. If personal use is gained from that vehicle, it's purely by accident. The tool is suited to the application.

The people in personal-computing companies use the company's products for their own productivity. But the company, sadly, often institutionalizes the computing. Then the company proudly tells the world about it. Each says it has no more typewriters. Each considers its products to be productivity tools, and then says its employees use the computers in that fashion. Some of the shoe-maker's children do. But some have no shoes.

If you're someone who can tell the difference between good sound and *better* sound—and you're someone who *cares*...

if you're someone who gets deeply involved in your audio system, inside and out—choosing only the best—and then adjusting, adding, converting and *improving* on its sound...

then you'll be at home with AUDIO—the magazine *knowledgeable* audio-philes turn to for

the latest word in new equipment

AUDIO gives you

- over 370 pages of equipment test reports a year
- fascinating articles on the construction of state-of-the-art gear, on design and theory
- plus the "What's New" showcase—where you're always the first to know what's new, how much it costs and when to buy.

buying and selling guidance

- AUDIO's mammoth Annual Equipment Directory is considered "the bible of the industry"—with over 45,000 specs on 2,800 home stereo components last year.
- And the Audio Marketplace gives you 14 or more pages of classified ads every month to help you buy, sell or exchange equipment.

technical how-to guidance

- AUDIO gives you practical, authori-

If Your Ear Demands the Best, Treat Yourself to **Audio** the Top-Performing Magazine on Hi-Fi

tative help for making adjustments, conversions and additions to your system—the right way, the first time.

- And in every issue, AUDIO's experts answer readers' technical questions. Whether published or not, every question gets an answer—no limit to AUDIO subscribers! It's the only magazine that will answer your questions personally.

Plus

—in every issue, you get record reviews, interviews, and coverage of new product shows and special events.

Get the Best Price Available

You can get a full year—12 monthly issues of AUDIO for only \$6.97. That's HALF the regular subscription price of \$13.94. (12 issues at the newsstand would cost you \$18.45!)

Or Double Your Savings!

Subscribe now, and you can take advantage of this HALF PRICE offer for two years. Beat inflation, and get the next 24 monthly issues for only \$13.94.

So subscribe today! Use the reply card bound into this magazine, or write to AUDIO, 1255 Portland Place, P.O. Box 5318, Boulder, CO 80322

AUDIO

The Authority in Sound



The Small Business Was Under Financial Siege . . .

. . . And an accounts-receivable package put cash flow on track

by Theresa Engstrom

"We were drowning in our own bookkeeping," says Dan Rennie, until recently the owner of a San Jose art supply house called Pen and Brush. "Customers were taking 60 days or more to pay their bills. And the bank was telling us we had to do something about our cash flow or we would risk losing our credit."

Rennie's description of the way his store operated is not unique among small businesses, where an economic bunker mentality has become a fact of life for many. Too often, bills mailed out to customers sit around unnoticed and unpaid for months while the business is hounded by banks and creditors who want their loans paid on time. In Rennie's case, this situation had been building for close to eight years since the day the store opened its doors. And it came to an abrupt halt in February 1981 when Rennie bought an Apple computer and an accounts-receivable program that turned the trickle of incoming payments into a steady flow of paid invoices.

After Pen and Brush's first year of business in 1973, its annual sales were \$20,000 with few open accounts. Keeping records of invoices and payments manually was not difficult then, and Rennie, because he was the owner and sole employee,



Dan Rennie used an Apple computer system to pull his art supply house, Pen and Brush, out of a cash-flow bind.

became the chief bookkeeper. From that vantage point he watched the process of keeping the store's customer accounts current deteriorate until, by 1981, when the store was selling \$250,000 a year in art supplies, a computer seemed the only answer. In hindsight, Rennie says, the threshold for the personal-computer purchase was probably closer to \$100,000 in annual sales.

"Any business that sells \$100,000 a year and has salesmen developing outside accounts has to computerize its accounting operation if it's going to keep up with its receivables," he says. "After we bought the computer, we had an immediate improvement in

our payment pattern. We were getting our invoices out faster and usually our customers paid within 30 days. Not only were we happy, but the bank was certainly satisfied with our improved cash flow."

Order out of chaos

In most cases where the personal computer has been put to the task of bookkeeping, it has ended up at least creating order out of the chaos. Personal-computer accounting programs are among the most popular software on the market. The reason is obvious. Like spreadsheeting, the way a business handles its books is at the heart of whether the operation succeeds or not.

In general, a good accounts-receivable package will track each customer, compute the amount owed, issue monthly invoices, generate overdue notices, credit payments made to the proper accounts, and then calculate the closing balance. In general, doing all that with pen, typewriter and paper is a time-consuming and difficult chore.

While all of the basic packages on the market perform these tasks, the newer software is considerably more powerful. What is usually added is flexibility and the ability to keep more information. As an example of where accounting programs for the personal computer are heading, take the receivable program from Broderbund Software (San Rafael,

Theresa Engstrom, former editor of the New England Business Magazine, is a writer from Sharon, Mass.

Calif.), just released in August. The company claims that its package will handle 400 customers and 1700 transactions per diskette, an unusually large amount of data for software of this type to carry. In addition, the program breaks sales into 20 different categories, a feature that will gladden the hearts of inventory keepers trying to monitor the merchandise leaving the shop. And Broderbund's package also generates a report based on 14 criteria. A retailer, for instance, could ask for a list of all customers in Minneapolis who spent more than \$500 last month on automobile engine parts—and who paid their bills promptly. With that in hand, he could, as an example, develop a mailing list of preferred customers for future advertising campaigns.

Though these are unusually powerful elements for a personal-computer accounts-receivable program, many businesspeople using some of the other software packages say that with systems already in place at their firms they're not about to reorder their programs at this point. But they add that the leapfrogging of computer muscle demonstrated by Broderbund—putting most of a mini's power into a personal computer, as the advertisements claim—convinces them that their decision to turn their bookkeeping over to the personal computer was not a poor choice, and that a continuing evolution of all types of bookkeeping software is in the offing.

Too long to wait

Rennie made the decision to purchase his Apple II and an accounts-receivable program from Systems Plus (Palo Alto, Calif.) when he began to see already delivered commercial orders—a \$7000 purchase by Atari, for instance—sitting around “uninvoiced” for as long as two months.

“At that time I was writing invoices by hand,” he says, “and if there

was a dunning message necessary, I typed it onto the invoice. It's a simple fact, but when you're doing it manually you don't monitor customers as often as you would on the computer.”

So, with a friend from the Stanford University engineering school, Rennie started making the rounds of computer stores. He took a month to try out all the available accounting programs and the hardware that they run on. Because the package from Systems Plus, with its ability to easily

access a firm's general ledger of customers, has garnered a reputation for being simple to use and implement, Rennie finally settled on that product.

Software likes and dislikes

With his new system in hand, Rennie spent a couple of days learning the software—“its likes and dislikes”—and then began inputting the 70 major accounts Pen and Brush had at the time, a relatively painless chore, he remembers. “Once you under-



photos by George B. Fry III

It took Dan Rennie just a couple of days to input his 70 major accounts and begin to issue computerized invoices. Then he saw immediate improvement in his cash flow.

“With accounts-receivable packages, many small-businessmen are enjoying the view out from under the financial bunker.”

stand the software,” he says, “the mechanical part of putting data in is not so difficult. It’s just a matter of putting in names and figures at random, really. The computer puts it all in order for you.”

A psychological prod

And that, Rennie says, was all that he had to do before he came to the best part—issuing his initial batch of computerized invoices. While that was a proud moment for him, the computer-generated bills also clearly changed the attitudes of his customers toward paying on time. He describes it as a “psychological prod,” the fact that customers devote more attention to an invoice printed out on a computer than they do to a handwritten bill. This is because, Rennie says, bills issued by a computer look “more official” and imposing than a handwritten invoice.

The process of working with the Systems Plus accounts-receivable program begins when the computer calls up from the diskette memory—and brings to the screen—the general ledger, which is the list of the firm’s accounts. After that it asks the user for the number of the account that he wants to work on. After the account is accessed, the user can add any new purchase order information—such as materials bought and at what price—the discount involved, the payment terms, dunning messages and freight costs. From that information the computer calculates up-to-date billing data for the account. At this point, current invoices can be printed out. And if the account is over its credit allowance, the computer alerts the user, who can override the alert or take action with the customer.

While Systems Plus has its share of converts, there are many other accounts-receivable packages that have been as well received. And almost every user will gladly tell you his favorite reason why his program ranks among the best.

For instance, protection against

errors rates high as a feature to look for in an accounts-receivable program. To any small businessman, the thought of accidentally deleting a dollars-and-cents account, or losing a portion of his bookkeeping file, can be chilling.

Take Dr. Stephen A. Imbeau who uses the accounts-receivable program from BPI (Austin, Texas) in his office in Florence, S.C. He runs it on an Apple II Plus with 64k. And among his reasons for sticking with BPI is that it checks his tendency



Peggy Crawford had an initial bout with documentation problems, but she soon grew comfortable with computer terms.

to rush through his bookkeeping chores—and at times make errors.

Strive for accuracy

“If I’m not looking and I’m totaling too soon,” he says, “or if I’m moving figures in and out too soon (which can lead to putting the wrong numbers in the wrong categories or accounts), the computer beeps and the cursor goes back to where it should be.” No amount of rushing, he says, will defeat the program’s striving for accuracy.

Marilyn Graves, office manager of Fidelity Manufacturing in Burbank, Calif., who uses the State of the Arts

(Costa Mesa, Calif.) accounts-receivable program, by her choice of software echoes Dr. Imbeau’s belief that errors are counteracted. “If you’ve done something stupid,” she says, “it just tells you to go back and do it again. You can’t delete anything by mistake.”

With any type of program, the support that the software manufacturer provides is often crucial to the correct implementation of the package into a business. And many small-businessmen feel that when you’re dealing with a bookkeeping package—the financial lifeline of a company—the word crucial cannot be emphasized enough. Support, or the willingness of the software house to be on call while a user is adjusting to the new program, can, for a business, be like having a consultant move in for a few months while the accounts-receivable program is being set up.

Dialing the support line

Most accounts-receivable software houses answer the call for help quite well. For instance, many have toll-free phone lines for quick assistance. And Mark Freer, owner of Hydrosphere, an Anaheim, Calif. plastics industry supplier, relates that the software house he deals with, Continental Software (Culver City, Calif.), has always been willing to go the extra support mile with him—and they have also been patient as he has learned the needs of his business.

“I can’t believe how much help they’re willing to give me,” he says. “I must have traded in software with them 10 times since I became their customer. Most of the time, though, I just call them and they correct the problem right over the phone. The last time it took them only two minutes.”

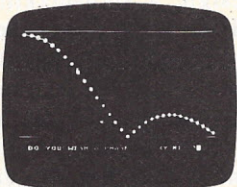
The major complaint that accounts-receivable program users have is that the documentation can be too complicated and not explicit enough for small-businessmen who

DYNACOMP

THE LEADING DISTRIBUTOR OF
Microcomputer Software
for



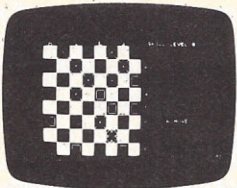
GIN RUMMY



FOURIER ANALYZER



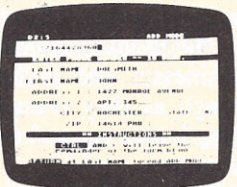
FOREST FIRE



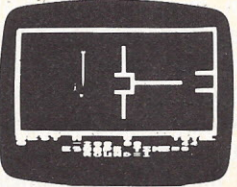
CHECKERS 3.0



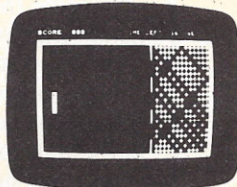
TEACHER'S AIDE



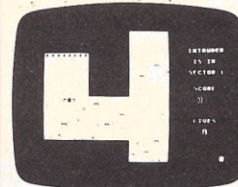
MAIL MASTER



ESCAPE FROM
VOLANTUM



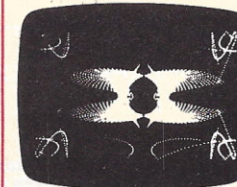
BREAKUP



INTRUDER ALERT



PERSONAL FINANCE
SYSTEM



CRYSTALS

- APPLE
- ATARI
- NEC PC 8000
- NORTHSTAR
- OSBORNE
- PET/CBM
- TRS-80
- SUPERBRAIN
- CP/M Disks & Diskettes

DYNACOMP offers a comprehensive collection of software in every category:

- ☒ Business/Utilities
- ☒ Personal Finance
- ☒ Education
- ☒ Statistics
- ☒ Engineering
- ☒ Adventure
- ☒ Games
- ☒ Thought Provokers
- ☒ Card Games
- ☒ And Much Much More!



DYNACOMP provides friendly, accessible customer service through our highly qualified and knowledgeable staff. We are as near as your telephone!

DYNACOMP'S prices are highly competitive and we promise prompt processing of every order!

DYNACOMP, the leading distributor of microcomputer software spans the globe in sales. We currently distribute software to over 50 countries. As we have grown, we have expanded our product line, while still maintaining a high level of quality customer support. This is confirmed by our many repeat customers, the consistent top reviews in leading industry publications, and program display on network television. We are proud of our variety (currently in excess of 150 titles!), quality and service. You can count on DYNACOMP.

Write For A Free, Detailed Catalog:

**DAYTIME TOLL FREE
ORDER PHONES:**
(800) 828-6772
(800) 828-6773

DYNACOMP, INC.
1427 Monroe Avenue
Rochester, NY 14618

**24-HOUR MESSAGE &
ORDER PHONE:**
(716) 442-8731

OFFICE HOTLINE
(9-5 EST) (716) 442-8960

CHANGING ADDRESS?

If you're planning to move, please let us know at least six weeks before changing your address. For fastest service, attach your current mailing label and fill in your name and new address in the space provided. This will insure accurate and prompt service on your subscription.

Name _____
New Address _____
City _____ State _____

Send old label with your
name and new address to:

PERSONAL COMPUTING
P.O. Box 2942
Boulder, CO 80322

MONEY MAESTRO.

**The easy-to-use money-manager
that takes your budget-tracking and
tax-reporting seriously.**

MONEY MAESTRO™ is a personal banking system designed for microcomputers by InnoSys Incorporated, specialists in financial software. It relieves you of the troublesome details of financial recordkeeping and provides you with the information you need to manage your money easily and accurately...daily, weekly, monthly, annually.

Sole proprietors, free-lancers and families can realize the benefits of automated money-management without investing in double-entry accounting software. And, MONEY MAESTRO is designed to be used **entirely without documentation** and can be easily run by the computer novice!

Money Maestro™

is available for the IBM® Personal Computer,
XEROX® 820, Osborne® 1, North Star ADVANTAGE,
Apple® II and most CP/M® Systems.

Want to know more about MONEY MAESTRO? Use the Reader Service Card or drop us a line at the address below. If you're in a hurry, call us at (415) 843-8122.

MONEY MAESTRO is available for \$200 at The Xerox Stores, Osborne dealers and selected independent dealers.

InnoSys
INCORPORATED

2150 Shattuck Avenue, Suite 901
Berkeley, CA 94704

IBM is a registered trademark of International Business Machines Corp. XEROX and 820 are registered trademarks of XEROX Corporation. Osborne 1 is a registered trademark of Osborne Computer Corporation. Apple is a registered trademark of Apple Computer, Inc. CP/M is a registered trademark of Digital Research, Inc.

BUSINESS


may be taking their first shot at computerized bookkeeping.

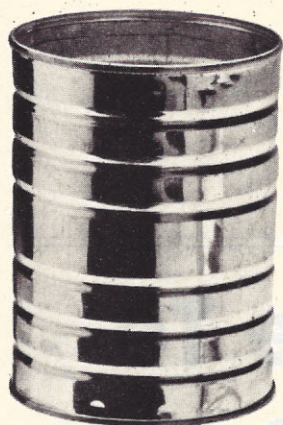
Peggy Crawford, vice president of Executive Design, a sign-making firm in North Hollywood, Calif., uses the accounts-receivable program from Continental—and has learned to love it—but she remembers the bad old days when she first bought the program and wondered if her purchase was a mistake. The complex documentation heated her fears.

"I love it now," says Crawford, "because I hated sitting down for eight hours writing out invoices and sales reports. I couldn't go back to doing the books manually. But it took me about six months to get comfortable enough with the program to say this. I had a lot of trouble understanding the manual. Because I'm used to doing the books by hand, I didn't understand the terms that the software manual was using."

A minor grievance

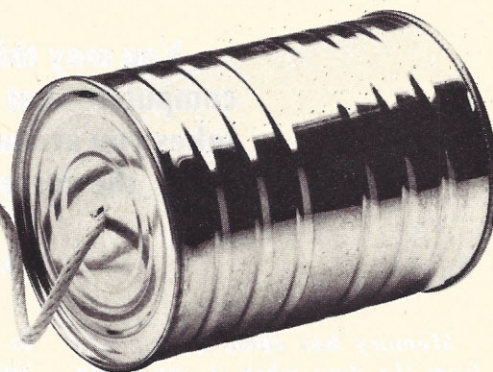
This is perhaps a minor grievance, especially to most users who finally get their programs up and running and become satisfied with the direction their bookkeeping has taken. But Dan Rennie heard documentation complaints from his peers so many times that he seized the opportunity to profit from this problem. He sold his art supply store to his partner earlier this year and went into the consulting business where he will attempt to clear up the confusion that some small businesses and professionals go through as they transfer their bookkeeping from a manual system onto a computer.

The obstacles, though, are minimal, and well worth the effort to overcome them, most users say. Still, throwing away the manual bookkeeping system that served so faithfully—but perhaps not so well—does take some nerve and lots of faith. But switching to a computerized billing operation has many small-businessmen enjoying the view out from under the financial bunker. 



**A
communications
package
that's slightly
easier to use
than
MICRO/Terminal.**

**But
a lot less
functional.**



At MICROCOM we've made communicating with all kinds of computers easier and less expensive. Now, with MICRO/Terminal™, users of Apple II™, Apple III™ or IBM® Personal Computers can easily access any in-house or remote database. Directly, with a minimum of effort. With MICRO/Terminal, communications set-ups and log-on routines are entered only once. From then on they can be called up automatically. A built-in editor lets you change part of a program without re-doing all of it, and you can edit off-line.

Plus you can access your company computer and more than 1,000 commercial services. The price? Under \$100. So that by comparison with other systems, anything else is like talking through a tin can.

Just ask your computer dealer for more details.



MICROCOM
We make little computers talk big.

1400A Providence Highway, Norwood, MA 02062

MICRO/Terminal is a trademark of MICROCOM, Inc. Apple II and Apple III are trademarks of Apple Computer Inc. IBM is a registered trademark of International Business Machines Corporation.

More Computer Muscle To Power The Machine

You may think you need more memory in your computer—but beware of pitfalls. This special report takes you around the landmines and down the road to the correct use of extra computer power

by Lee Thé, Associate Editor

Memory has come a long way from the days when it was bulky, costly and very power hungry. New memory-device designs promise to put more memory into smaller spaces, which will translate into more memory for the consumer dollar.

Memory technology—like computing technology in general—doesn't stand still for long. The only sure thing about memory is that you never have enough. As you begin to explore the capabilities of your computer, you'll find that it will be able to do so much more with just a little bit more memory. And on it goes.

Welcome to the horsepower race of the '80s—the contest among computer makers to tout progressively bigger memories, faster central processing units, more massive mass storage. Like the automobile horsepower race of the '60s, added computing muscle can translate into useful results. Unlike automobiles, you can add cylinders under a computer's hood. As with the automobile, there are questions—practical questions.

Can you actually use all this muscle? Just what is memory? How can it be added? What could that do for you? What pitfalls are there? What's available now, for how much, on what machines? Is it easier to add memory

to some computers than to others? Should you do it yourself? Can your present software handle more memory? How much memory do you need? How much might you need later?

Never enough memory

Quantitatively speaking, you will never really have enough computer memory. Think of it this way. How much memory would you like your brain to have? Wouldn't you like to be able to remember every skill you ever learned, every person you ever met, every useful fact that ever brushed by you? Could you imagine ever saying to yourself, "I have enough memory. I don't need any more"? Of course not.

Personal computing, in a very real sense, is a direct extension of your mind and the data you command. When you talk about how much memory you want your computer to have you're talking about how much memory you want yourself to have. You're talking about how quickly, how thoroughly and how easily you want your computer to help you in your drive toward your life's goals.

The reality of mass storage

From that perspective you'll want every byte of RAM you can cram into your machine, just as you'll also want as much mass storage as you can

have. As you empower your machine you empower yourself. You increase your effective IQ. Would you like that? Of course. With that in mind let's take a look at the reality under the computer's hood.

What were the deductions on your 1981 tax return? When is your wedding anniversary? How do you extract a square root?

The tax numbers are probably not in your mind's active memory, but you're likely to have a marker there to lead you to a file. That file is your mass storage—where you put masses of information that would otherwise clog your active consciousness. The wedding anniversary date resides in your active memory—well, it better reside there—part of an immense number of facts you can access (get at) at random, immediately, like your social security number, or recent events like what you had for lunch today. That's your Random Access Memory (RAM). Extracting the square root calls up a process—a learned set of instructions. That process also resides in your RAM. You probably put it there through exposure to a course (program) in math.

Your memory varies both in character (skills, recollections, operating space) and in strength. Thus you may have sharp driving skills, fair French,

(continued on page 93)

MEMORY BUYERS' GUIDE

Literally hundreds of firms could appear on this chart. Those listed here are the better-known ones. Many of these added memory devices come with associated software and hardware that increase their utility for various tasks, so two firms making 16k RAM cards for an Apple may, in fact, be offering two very different products. And many offer ROM chips in conjunction with their RAM products. You should also be aware that most computer manufacturers sell additional memory for their own machines.

Advanced Logic Systems
1195 East Arques Ave.
Sunnyvale, CA 94086
(408) 730-0306
Apple: 16k card—available bundled with 80-column card and CP/M card
CIRCLE 450

Anfex Data Systems
2630 California St.
Mountain View, CA 94040
(415) 941-7914
IBM Personal Computer: 64-256k
CIRCLE 257

Apparat, Inc.
4401 So. Tamarac Pkwy.
Denver, CO 80237
(303) 741-1778
Apple II Plus, Radio Shack TRS-80 Models I & II, IBM Personal Computer: chips for motherboard; Commodore VIC-20: 8k RAM cartridge
CIRCLE 453

ASAP Computer Products, Inc.
1198 E. Willow St.
Signal Hill, CA 90806
(714) 891-2663
IBM: cards 64-256k; Atari: cards 16 or 32k; S-100-type computers: cards (16-64k)
CIRCLE 454

AST Research, Inc.
2691 Richter Ave.
Irvine, CA 92714
(714) 540-1333
IBM Personal Computer: 64-256k
CIRCLE 253

Axlon, Inc.
170 N. Wolfe Rd.
Sunnyvale, CA 94086
(408) 730-0216
Atari 400 & 800: 32k Memory Module; Atari 800: 128k disk emulator (also usable as bank-selected RAM); Atari 400: 48k Memory Module; Apple II & II Plus: 320k 2-drive disk emulator with battery backup
CIRCLE 455

California Computer Systems
250 Caribbean Dr.
Sunnyvale, CA 94086
(408) 734-5811
64k boards for CCS and other S-100 computers
CIRCLE 456

Chrislin Industries
31352 Via Colinas
Westlake Village, CA 91362
(213) 991-2254
IBM Personal Computer, S-100, multibus systems, 64-512k
CIRCLE 260

CompuPro Division Godbout Electronics
P.O. Box 2355
Oakland Airport, CA 94614
(415) 562-0636
8-128k boards for CompuPro and other S-100 computers
CIRCLE 457

Cromemco
280 Bernardo Ave.
Mountain View, CA 94043
(415) 964-7400
64-512k boards for Cromemco and other S-100 computers
CIRCLE 459

Davong Systems, Inc.
1061 Terra Bella Ave.
Mountain View, CA 94043
(415) 965-7725
Apple II: 16k cards; IBM Personal Computer, 64-256k cards
CIRCLE 460

Hurricane Labs
5149 Moorpark Ave.
San Jose, CA 95129
(408) 257-8676
Radio Shack: 64k card with additional functions
CIRCLE 464

Intercontinental Micro Systems Corp.
1733 S. Douglass Rd.
Anaheim, CA 92806
(714) 978-9758
S-100: 256k card
CIRCLE 451

Intermedia Systems
10601 South De Anza Blvd.
Cupertino, CA 95014
(408) 996-0900
IBM Personal Computer: 192-512k
CIRCLE 465

Legend Industries Ltd.
2220 Scott Lake Rd.
Pontiac, MI 48054
(313) 674-0953
Apple II: 64-128k cards
CIRCLE 466

Lomas Data Products
729 Farm Rd.
Marlboro, MA 01752
(617) 481-2822
S-100: 128k static, 128-256k dynamic
CIRCLE 255

Macrolink Inc.
1150 E. Stanford Ct.
Anaheim, CA 92805
(714) 634-8080
IBM Personal Computer: 64-256k cards
CIRCLE 467

Macrotech International Corp.
22133 Cohasset St.
Canoga Park, CA 91303
(213) 887-5737
any S-100 based system: 256k card
CIRCLE 251

Magnolia Microsystems
2264 15th Ave. W.
Seattle, WA 98119
(206) 285-7266
Heath/Zenith 89.90: 128k RAM board/disk emulator
CIRCLE 468

Memory Merchant
14666 Doolittle Dr.
San Leandro, CA 94577
(415) 483-1088
S-100: 64k
CIRCLE 254

Memory Technologies, Inc.
25 Main St.
Twelve Mile, IN 46988
(219) 664-5741
IBM Personal Computer: 64-512k and memory-expansion chips
CIRCLE 469

Memotech
7550 West Yale Ave., Suite 200
Denver, CO 80227
(303) 986-1516
Timex-Sinclair 1000, Sinclair ZX81: 16-64k total RAM via modules
CIRCLE 470

Micro Intercontinental Systems Corp.
1733 South Douglass Rd., Suite E
Anaheim, CA 92806
(714) 978-9758
S-100: 256k card
CIRCLE 471

Microsoft Consumer Products
10700 Northup Way
Bellevue, WA 98004
(206) 828-8080
Apple II: 16k card; IBM: 64-256k cards
CIRCLE 473

Mosaic Electronics
P.O. Box 748
Oregon City, OR 97045
(503) 655-9574
Atari 400 and 800: 32k card
CIRCLE 475

Mountain Computer
300 El Pueblo Rd.
Scotts Valley, CA 95066
(408) 438-6650
Apple II: 16-32k RAM cards
CIRCLE 476

MPC Peripherals Corp.
9424 Chesapeake Dr.
San Diego, CA 92123
(714) 278-0630
Apple II: 128k disk emulator card using bubble memory
CIRCLE 477

MTI (Microcomputer Technology, Inc.)
3304 W. MacArthur
Santa Ana, CA 92704
(714) 979-9923
Apple II, Radio Shack TRS-80 Models I & II, S-100 computers: RAM chips; MTI CX: highly modified TRS-80 Model III with 16k extra RAM
CIRCLE 478

Personal Computer Products, Inc.
16776 Bernardo Center Dr.
San Diego, CA 92128
(714) 485-8411
Apple II, III: 64k plus alternate processor, clock, other functions
CIRCLE 481

Persyst
22957 La Cadena
Laguna Hills, CA 92653
(714) 859-8871
IBM Personal Computer: 64-256k
CIRCLE 261

Precision Technology Inc.
Computer Products Division
2970 Richards St.
Salt Lake City, UT 84115
(801) 487-6266
VIC 20 card
CIRCLE 483

Quadram Corp.
4357 Park Dr.
Norcross, GA 30093
(404) 923-6666
8-64k print spooler for Epson and similar printers, most computers; IBM Personal Computer: Quad Board with 64-256k + clock, parallel, serial ports
CIRCLE 484

Quantum Data, Inc.
3001 Redhill Bldg. 4, Suite 105
Costa Mesa, CA 92626
(714) 966-6553
Commodore VIC, 16 and 24k cards
CIRCLE 486

Renaissance Technology Corp.
1070 A Shary Circle
Concord, CA 94518
(415) 676-5757
NEC PC-8000: 32k RAM card
CIRCLE 487

Saturn Systems
P.O. Box 8050
Ann Arbor, MI 48107
(313) 973-8422
Apple II: 32-128k RAM cards
CIRCLE 488

Seattle Computer
1114 Industry Dr.
Seattle, WA 98188
(800) 426-8936
IBM: 64-256k RAM cards; Seattle and other S-100 computers: 4-64k RAM cards; some with additional functions
CIRCLE 490

Sigma Designs, Inc.
3866 Eastwood Circle
Santa Clara, CA 95055
(408) 496-0536
IBM Personal Computer: 64-256k cards and memory-expansion chip
CIRCLE 492

SSM Microcomputer Products, Inc.
2190 Paragon Dr.
San Jose, CA 95131
(408) 946-7400
S-100 computers: 32-64k RAM cards
CIRCLE 493

Static Memory Systems
401 State Bank Center
Freeport, IL 61032
(815) 235-8713
S-100: 32-64k
CIRCLE 258

Systems Group
1601 W. Orangewood Ave.
Orange, CA 92660
(714) 633-4460
S-100: 64-128k
CIRCLE 252

Tara Computer Products
3648 Southwestern Blvd.
Orchard Park, NY 14127
(716) 662-7219
Atari 400: 16-48k cards; Apple II: 16-128k
CIRCLE 496

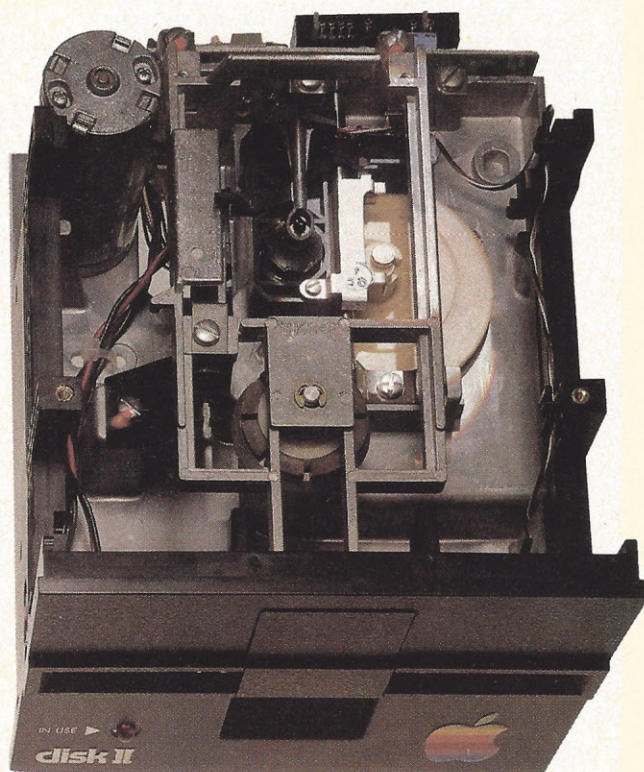
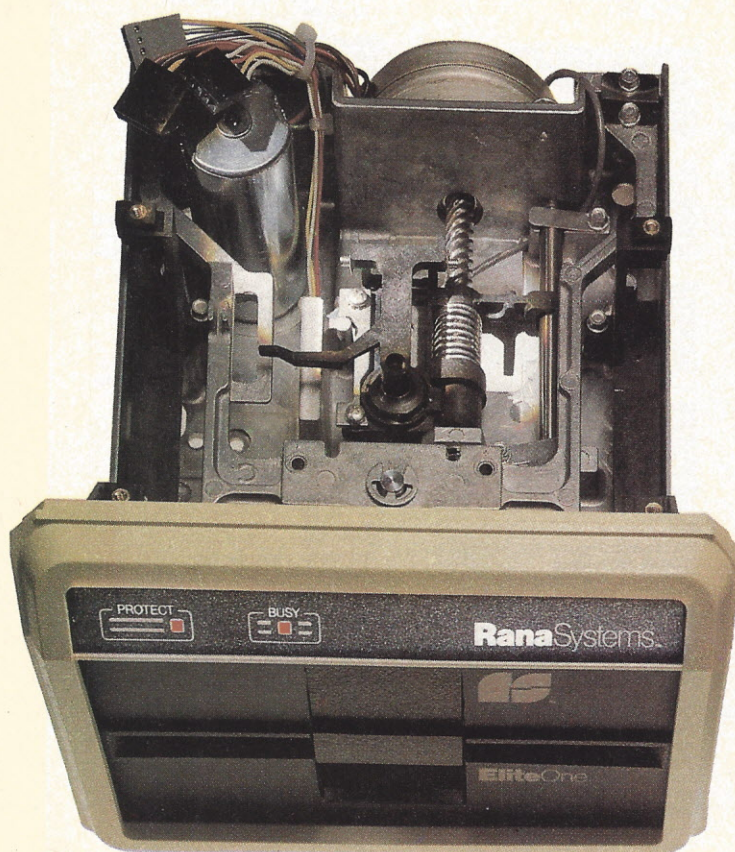
Tarbell Electronics
950 Dovlen Pl., Suite B
Carson, CA 90746
(213) 538-4251
64-128k RAM cards for Tarbell and other S-100 computers
CIRCLE 497

TecMar
23600 Mercantile Rd.
Cleveland, OH 44122
(216) 464-7410
IBM Personal Computer and S-100: 64-256k RAM cards
CIRCLE 498

Vista Computer Co., Inc.
1317 E. Edinger Ave.
Santa Ana, CA 92705
(714) 953-0523
IBM Personal Computer: 256-576k
CIRCLE 499

VR Data
777 Henderson Blvd., N-6
Folcroft, PA 19032
(800) 345-8102
IBM Personal Computer: 64-192k RAM cards
CIRCLE 500

When you say your disk drive has more juice than Apple's, be prepared to cut one open.



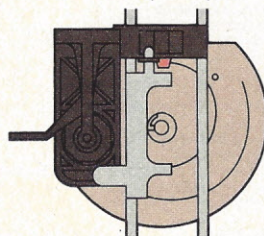
The problem with Apple's disk drive stems from the core.

There are a lot of good reasons why dealers all over America aren't recommending Apple's disk drive. And one of the main reasons is Rana Systems' new Elite Series of Apple II compatible disk drives.

It's easy to see why Apple® has been having some major slipped disk problems. Just look at their antiquated head positioner.

Apple is a registered trademark of Apple Computer Inc.

It's plastic. Just like a toy. That's why it can take multiple passes to get the information needed. And why the information on your disk can appear obscured and unreadable. If Apple's positioner doesn't accurately center the head over your data tracks, it's no bargain at any price.



Apple's primitive plastic positioner. A workable, but sloppy, way to capture data.

Rana knows the head positioner is the heart of the machine, so we didn't cut any corners. To most accurately place the head over the data area we use finely machined lead screws and metal band positioners. They provide you with the fastest and clearest data recognition on the market. With three to four times faster

Rana's state of the art technology lead screw and metal band positioners give vastly improved speed and accuracy.

access, track to track. With far greater precision than Apple's, to give you virtually 100% data integrity.

More juice on Apple's inferiority.

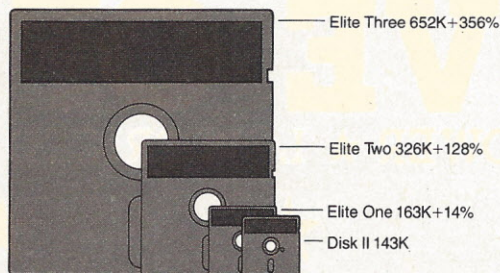
There's another big problem Apple has chosen to ignore. The irritating scratching noise that occurs when it is searching for information. Rana, on the other hand, has built the Elite Series to be virtually noiseless.

And more importantly, Rana has an advanced write protect feature which makes it impossible to lose your information. A simple touch on the front panel's membrane switch gives you failsafe control. Apple of course only has a notch or tab, which gives you only minimal protection.

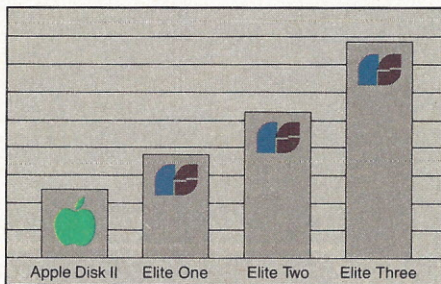
With the superior Elite controller card, you can control up to four floppy disks using only one slot. With Apple's you can only use two. Of course, you can still plug into Apple's controller card, but down the line you'll want to switch to Rana's and save yourself a slot.

Elite also gives you more byte per buck.

Even our most economical model, the Elite One, gives you 14% more storage than Apple's. 163K versus Apple's 143K. With our Elite Two offering 326K and our top-of-the-line Elite Three offering a 356% storage increase at 652K. That's almost comparable to hard disk performance, all because of our high density single and double sided disks and heads.



And the cost? Just look at the chart. 272 Bytes per dollar for Apple, versus between 363 to 767 Bytes per dollar for ours. They're not even close.



The real beauty of it isn't the beauty of it.

There is no comparison to the lean, clean design of the Elite Series to Apple's 5 year old model (which by the way has never been updated). It's our superior technology, operating economy, increased storage and faster step that makes us the best performing and hottest selling disk drive in America.

So give us a call or write for more information. It doesn't take a lot of courage to cut into an Apple when you outshine them as brilliantly as we do.

RanaSystems



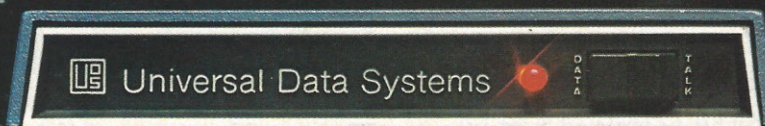
20620 South Leapwood Avenue, Carson, CA 90746 213-538-2353. For dealer information call toll free: 1-800-421-2207. In California only call: 1-800-262-1221. Source Number: TCT-654
Available at all participating Computerland stores, and other fine computer dealers.

FIVE OF A KIND

LOW POWER ★ LOW PRICED ★ LINE POWERED MODEMS

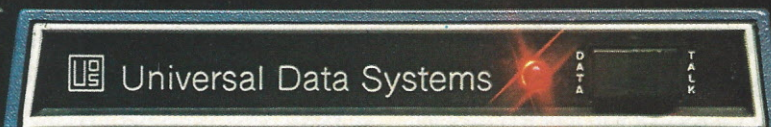


212 LP
originate/answer
1200 bps



\$495
(quantity one)

202S LP
auto-answer
1200 bps



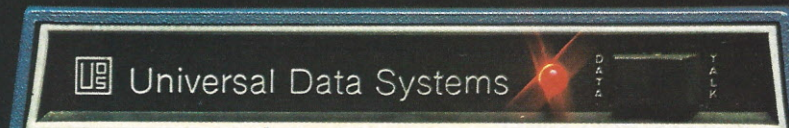
\$295
(quantity one)

202 LP
1200 bps



\$245
(quantity one)

103J LP
originate/answer
auto-answer
300 bps



\$245
(quantity one)

103 LP
originate/answer
300 bps



\$195
(quantity one)

All UDS LP modems are FCC-certified for direct connection to the telephone network and require no AC power connection. For details, contact Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Phone: 205/837-8100.



"Confidence in Communications"
Universal Data Systems



MOTOROLA INC.
Information Systems Group

DISTRICT OFFICES:

Old Bridge, NJ, 201/251-9090 • Blue Bell, PA, 215/643-2336 • Atlanta, 404/998-2715 • Chicago, 312/441-7450 • Columbus, OH, 614/846-7478 • Boston, 617/875-8868
Richardson, TX, 214/680-0002 • Englewood, CO, 303/694-6043 • Houston, 713/988-5506 • Santa Ana, 714/972-4619 • Sunnyvale, 408/738-0433

SPECIAL REPORT

MORE COMPUTER MUSCLE

(continued from page 88)

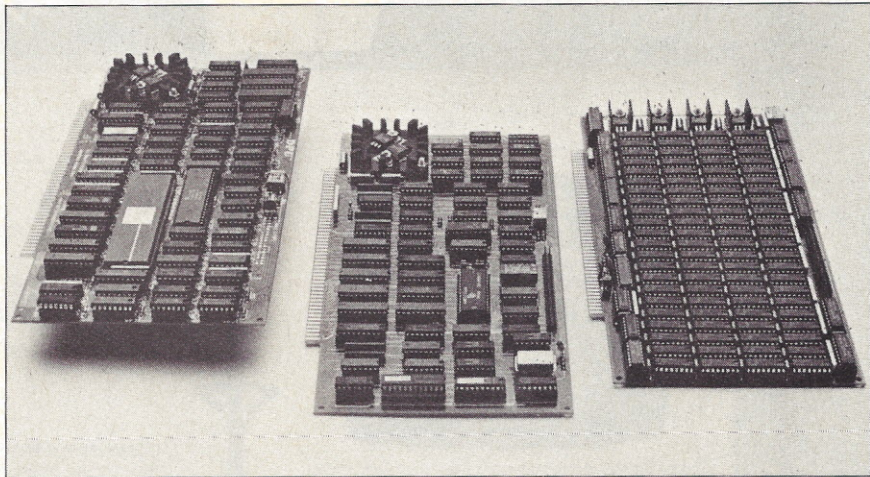
rusty trigonometry, and a faded recollection of facts picked up in the third grade about Indians who once lived where you live now.

Computer memory shades from one sort to another sort in much the same way as mind memory. RAM is ready memory and disk drives are storage memory. You might have archival storage on tape cartridge, such as what Corvus offers for its hard disk drives as backup. Hard disks are just that—hard. They spin faster than floppy disks, hold more data and can get at it faster, though still slower than RAM. They cost upwards of \$2000.

The human relationship

We humans and our computer creations can both be seen as having operating systems, programs and data space. All three are stored in mass storage and used in RAM—the active memory. Programs and operating systems can be stored in read-only-memory (ROM) also, including computer languages. Apple's Applesoft version of BASIC resides in ROM, for instance. Makers generally put into ROM what they don't think they're going to change or revise. That saves RAM for programs and data at the expense of flexibility. RAM can be changed at will; that's what it's for. ROM can be changed, too, by exchanging chips or in some cases burning a new memory into chips. RAM is what the makers are selling as computer horsepower. Let's look at how memory capability (that is, RAM) is placed into a computer.

At the lowest level, computer memory only sees things in black and white—on/off, yes/no, zero/one, however you want to look at it. That singular decision constitutes a "bit." It takes eight bits or so to define one symbol, like a letter or a number. Because memory, to be meaningful, has to be seen in terms of how many characters it contains, it is usually mea-



The dual-processor unit (left) from Cromemco (Mountain View, Calif.) runs the memory-control unit (center) which manages the memory-storage unit at right.

sured and described in bytes. This is also useful since the number of bits any given machine needs to define a character may vary somewhat. Some advanced computers need more bits per character because they do something called parity checking, which adds a double-checking bit to the bits in the byte to make sure it's the right byte. Bytes are measured in thousands (k) and millions (M—megabytes—megs).

Bytes reside in chips, disks, tapes, punched cards, paper tape. They also reside in exotica like videodisks and bubble memories. RAM-type bytes live only in chips. Chips (grown out of silicon and trace chemicals) are where the work is done. Without chips there would be no computing as we know it. You can't see the chips. They are housed in small, slim plastic, metal or ceramic packages with dozens of centipede feet extending down each side.

A computer's processor (central "brain") and much more are all on chips, packaged and mounted on green printed circuit (PC) boards that connect them all together via wires printed on the board. The main board is called the motherboard. Expansion cards containing things like extra RAM are inserted into slots on the motherboard or into other slots on or in the machine.

You can usually tell where the RAM is in a computer because you see rows of identical chip packages. Many computers can be bought with less than the full complement of RAM chips on the motherboard, so the first step of RAM expansion with these is filling in the sockets before

going on to RAM-laden expansion cards. RAM cards can also have empty sockets to provide stages of expansion.

Expanded memory lets you tackle bigger jobs. It can speed up your computing, make it easier to do, more convenient. It can add capabilities you formerly lacked and let you run large programs that combine the functions of several conventional programs.

Added memory can give you a luxurious, arms-spread-out kind of feeling. Working with larger tracts of data is surely the most obvious benefit of added RAM, especially when you need all your data in your RAM at once. In most spreadsheet programs, you want to see how a change in one factor can affect up to hundreds of others. Other things being equal, if you have to keep swapping data in and out of mass storage to alter a big model you could grow a beard waiting to see the results. That's why VisiCalc works entirely in RAM.

People using computers for professional applications tend to run out of room with their models as they get excited using them and as they factor in more and more facts and variables. Many people don't realize that just a little more memory can greatly expand the data space of RAM. That's because no matter what size the memory is, you need a certain amount, for the operating system and the application program's code. Everything above that is gravy.

For instance, a personal computer with 48k RAM (still a common
(continued on page 96)

ADDING AND POSTING ENTRIES

ADD JOURNAL ENTRIES
ENTRY NUMBER XX

1. JOURNAL NUMBER GL
 2. DATE
 3. DESCRIPTION
 4. ACCOUNT NUMBER
DEBIT CREDIT
 5. AMOUNT
- IS THIS ENTRY CORRECT? Y

On the Add Journal Entries screen you will be prompted to supply the journal number (1-9999). This number identifies transactions as belonging to a subgroup within the batch. For example, all figures concerning the general checks issued in a particular payee may be in one particular journal, and the batch number may consist of all different payees. The number you enter will be the default journal number for subsequent entries, until you change it.

For the first entry in a batch, the default date will be the batch date. The default date for succeeding entries will be the same as the previous entry's date.

When entering Debits or Credits on the Add Entries screen, remember that you must provide offsetting entries to keep the debits in balance with the credits. Credits are entered by first pressing RETURN, moving the cursor to move to the CREDIT column, and then entering the amount. If you have made a mistake in entering a debit or a credit, and have already pressed RETURN, simply press N to RE-ENTER ENTRY CORRECTLY. To change the amount line, press the selection number for amount, position the cursor to either the debit or credit column (remember that RETURN will move it to the credit column), then type a zero, and press RETURN again. This will automatically clear any amount you've entered, allowing you to type in a different amount. When you have finished making your entries, you must press END to return to the Journal Entry Menu.

Selection 5 allows you to post your entries. Post Entries is the process whereby any make your journal entries permanent. Once entries have gone through the Post Entries process, they cannot be changed except through adjusting journal entries.

51194-1

DATE 04/15/82
PAGE 1

ENTRY NUMBER ACCOUNT NUMBER JNL DATE DESCRIPTION DEBIT CREDIT

1 70450 01004 04/15/82 COMMISSIONS FOR 4-95 2,544.75

2 72800 01004 04/15/82 COMMISSIONS 4-97 2,544.75

JOURNAL TOTALS 2,544.75 2,544.75

3 70190 01007 04/15/82 SALARIES 4-92 42,094.00

4 70200 01007 04/15/82 SALARIES 4-92 16,118.00

5 70190 01007 04/15/82 PAYROLL 4-92 800.00

6 70200 01007 04/15/82 PAYROLL 4-92 1,712.42

7 70200 01007 04/15/82 PAYROLL 4-92 10,400.00

8 70190 01007 04/15/82 PAYROLL 4-92 42,118.48

JOURNAL TOTALS 42,118.48 42,118.48

F BATCH TOTALS 42,118.48 42,118.48

GENERAL JOURNAL REPORT

This report shows all journal entries that have been made to the General Ledger. You will see print this report for Transfer Entries and in a slightly different form, for Standard Entries. Please consult the Chart Of Accounts report key for standard items not explained here.

- A BATCH DATE 06/15/82 — Date entered at the start of the Journal Entries program.
- B JNL NUMBER — This is entered during Journal Entries, representing a group of similar entries.
- C DEBITS — The dollar amount of the entry, if entered as a debit.
- D CREDITS — The dollar amount of the entry, if entered as a credit.
- E JOURNAL TOTALS — The total of all debits and credits for this journal. All debits should equal all credits.
- F BATCH TOTALS — The total debits and credits for the batch. Total debits must equal the total credits for the batch.

A Cheap Trick.

The Dakin 5 Business Bookkeeping System. We do more, faster—yet cost less than any comparable program!

That, our competitors may feel, was a cheap trick.

Not so. It took no magic at all to make us shine. We used our heads—and gave our customers what they asked for. A quick, easy-to-use system that encompasses general ledger, vendor activity, customer activity and employee activity. Aging with receivables. Visual documentation. Toll-free hot line for technical support. And a reasonable price.

No matter what your accounting needs are—from personal to business—the Dakin 5 Business Bookkeeping System™ solves the problems. (So does our Budget Planner™, Depreciation Planner™,

Analyzer™ and Programming Aids™. But more on that and other versatile new tricks later.)

Dakin 5. We give it all to you. Faster, easier and for less. Honestly.

Just ask your local computer retailer.

Dakin 5. Answers that put an end to the disappearing dollar.

	Dakin 5	The "Other"
Documentation:		
Indexed	yes	no
"How to Use" Illustrations	yes	no
Extensive Error Trappings	yes	no
Toll Free Technical Support	yes	no
Demonstration Diskettes	yes	no
Number of Reports Generated	yes	no
Standard Entries	22	no
Easy Start Up	yes	16
User Friendly	yes	no
Complex Accounting	yes	no
Knowledge Required	yes	no
Displays Available	no	yes
Transactions	yes	no
Sort Key	yes	no
Summary Reports:		
Balance Sheet	yes	no
Trial Balance	yes	no
Profit & Loss Statement	yes	no
Price	\$395.00	\$395.00

DAKIN 5 CORPORATION

7000 Broadway, Suite 304, Denver, CO 80221 (303) 426-6090.

Toll free hot line: 800-525-0463

"You will want every byte of RAM you can cram into your machine. As you empower your machine, you empower yourself."

MORE COMPUTER MUSCLE

(continued from page 93)

amount) will have about 18k of space available for the VisiCalc spreadsheet. The rest is taken up with the computer's operating system (OS) and the VisiCalc program itself. Add 16k of RAM to that—say, with a RAM card—and the data space is increased to 34k. VisiCorp doesn't make versions of VisiCalc for more RAM than a computer maker makes itself. But other companies have programs to let you go further. So Mountain Computer is coming out with a \$150 program that lets you run VisiCalc files on an 80k Apple II—possible with their 16/32k RAM card. Result: 50k space for the spreadsheet—2.8 times what you could get with 48k.

But how much is that in terms of the spreadsheet? There's no easy answer to that because spreadsheets are three- or four-dimensional. Beyond their columns and rows (and depth, as with NEC's spreadsheet for its personal computer), you have the number and complexity of formulas plugged in, too. VisiCalc works within the boundaries of 63 columns and 254 rows regardless of memory size. But 48k computers run out of memory long before they fill up that space.

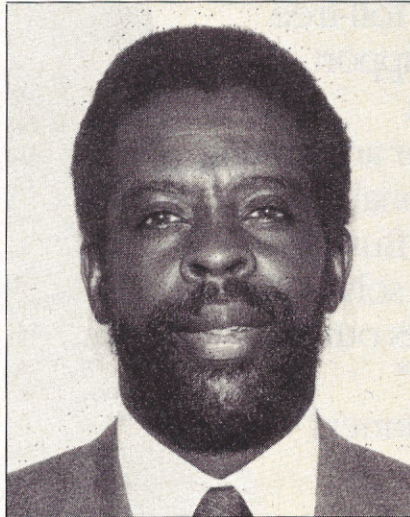
Spreadsheet guidelines

We can give you rough guidelines as to how much spreadsheet your RAM gets you. According to Jeff Walden, a writer and programmer working in Silicon Valley, his own annual budget takes 18-24 columns with quarterly and annual summations. The variation comes from the size of labels he uses. Vertically he'll use up to 130 rows. This takes up about 18k on his 64k personal computer. So even a home budget would tax the capacities of the average extant machine. Imagine what a business would need.

The same thing can be done with other spreadsheet programs (such as Sorcim's Supercalc) running on other personal computers (such as the Ra-

dio Shack Model III). Hurricane Labs of San Jose, Calif., makes a combination 64k RAM and processor card for the Model III, giving it a total 112k when you figure in the 48k a fully configured Model III carries. Charles Dixon, Hurricane's marketing manager, says they have tested a 48k version of the computer running CP/M and Sorcim SuperCalc. He reports it being able to handle a 26X26 matrix with the sort of mix of formulas and assumptions spreadsheets have. He estimates the Hurricane+ Model III will handle a 70X70 matrix of the same level of complexity—over seven times larger.

So bigger memory gives you bigger



Hurricane Labs' Charles Dixon says that a Model III and Hurricane's add-in board will handle a 70 by 70 matrix. That's a seven-fold increase over what a Model III can do on its own.

space. And it helps with things other than spreadsheets. For instance, if your word-processing software can use the larger space you can edit swiftly without having to wait for the computer to sniff around on your disk drive for what you need. This introduces the second benefit—time.

Many word processors are disk-oriented rather than RAM-oriented. They treat the whole disk as if it were in the RAM, and the software does

its work by swapping data on and off disk. Each instance of the computer going to the disk takes time. If larger chunks can be swapped into the RAM, time will be saved.

Saving time by swapping larger chunks is called track buffering; the computer actually gets much more into the RAM than the program needed at the moment, playing the odds that the next thing needed will be adjacent to the previous data. While that doesn't always happen, it happens often enough to speed processing appreciably.

Track buffering needs RAM to spare, in order to work. It speeds processing by cutting down on I/O needs. And reducing I/O will often increase net computing speed (throughput) more than would speeding up the processing itself. That's because most business applications don't put much demand on the computational abilities of the Central Processing Unit (CPU). Mostly you're getting stuff from mass storage, doing some very simple (mathematically speaking) operations on it and sending it back out to mass storage again. We call such computing "I/O-bound," because the performance bottleneck lies in how long it takes you to run the moving parts in disk drives and related activities.

Processor-bound computing

Scientific/engineering computing is often "processor-bound" because there the processor's ability to cogitate is stressed by complex mathematical operations. Here a speedy, powerful processor helps a lot. Speed is determined by how many millions of cycles a second (MHz, or Mega-Hertz) the processor's "clock" runs at. Power is determined mainly by the size of the processor's internal registers (a form of memory inside the processor it can use even faster than a computer's RAM). That's where you get references to 8-bit and 16-bit computers—16-bit computers have more power, basically, because they

Wabash Breakthrough:

- More Than 10,000,000 Test Passes Without Error
- Endorsement From The World's Most Prestigious Drive Manufacturers
- Compatible With All Office, Personal, Radiographic And Desk Top Computer Equipment
- Available Now In Our Innovative New Package
- Improved Coating Formulation
- More Reliable Than Ever
- Refined Burnishing Technique

For new brochure write:
Wabash DataTech, Inc.
Two Continental Towers
Suite 400
1701 Golf Road
Rolling Meadows, IL 60008
(800) 323-9868 (312) 593-6363



“At the lowest level, computer memory only sees things in black or white—on or off, yes or no, zero or one.”

can handle more data per cycle. So an “8 MHz, 16-bit computer” is hot stuff—but a big RAM may be more important for you.

The distinction between I/O-intensive and processor-intensive computing helps you analyze performance comparisons between computers. You may read a “benchmark test” comparing throughputs by running the same program on different machines and timing them. But for it to be really useful to you, the benchmark program must be as I/O- or processor-intensive as your computing normally is.

So don’t get caught in the wrong horsepower race. For most professional uses a large RAM and a hard disk drive are the two things that will speed up actual throughput the most. They reduce I/O time and speed up such I/O as you need. And of the two of them, added RAM generally costs a lot less. So it’s the natural place to start.

RAM can be software-configured to act like a solid-state disk drive that is many times faster than any real disk drive. This is called disk emulation. Just to keep things confusing, Axlon makes a disk drive emulator for the Apple that looks like an Apple disk drive, has the storage capacity of more than two electromechanical drives, and costs about what two drives cost. You still need a conventional drive to load programs and make backup/storage disks—but for I/O-heavy tasks this can be a god-send. If you’re using a computer now, think of all the finger-tapping time you put in staring at the little red light on your drive while it chatters to itself. What’s that total time of yours worth?

Disk emulation won’t load copy-protected software, so if your task keeps going to and from a copy-protected program disk a lot, you won’t save time. But if you keep going to and from a data disk a lot—or are doing things like compiling—disk emulation could pay for itself very

quickly. And a variety of RAM cards can be configured as disk emulators. Even smaller ones with 16k on them could do the job, depending on the size of the files you’re working with.

The large living space added memory can confer—along with the faster throughput reduced I/O can give—add up to making personal computing more convenient. But extra horsepower can also give you the equivalents of air conditioning, power steering, cruise control—not just the convenience of being able to haul more, faster. In a nutshell, more memory gives programmers room to build in helpful features, helpful to both the operating system and to application programs.

You can do the same using a lot of disk space and overlays. Overlaying software consists of creating an applications program too big to fit into your RAM and having the program go and get what it needs in order to execute your command. For instance, when you want to do a word count on text you’ve written in Hayden’s Pie Writer (for the Apple), you see the disk drive whirr about four seconds while the program goes and gets the code it needs to execute the command. It doesn’t hold that code in RAM, though. If you write five words more and do another word count, it still has to get that function off the disk.

More convenience features

Software overlaying is a good way to provide convenience features—like being able to get a word count—with limited RAM. But it’s even more convenient to get that feature without having to wait for the program to get the feature off the disk, at four seconds a pop.

Convenience features divide into those that help you learn (or relearn) how to use your system and its software, those that give you additional information, those that give you assistance if you need it, those that cut down on the amount of effort (often

measured in keystrokes) needed to get any particular task done, and those that increase your ability to control communications between you and the system.

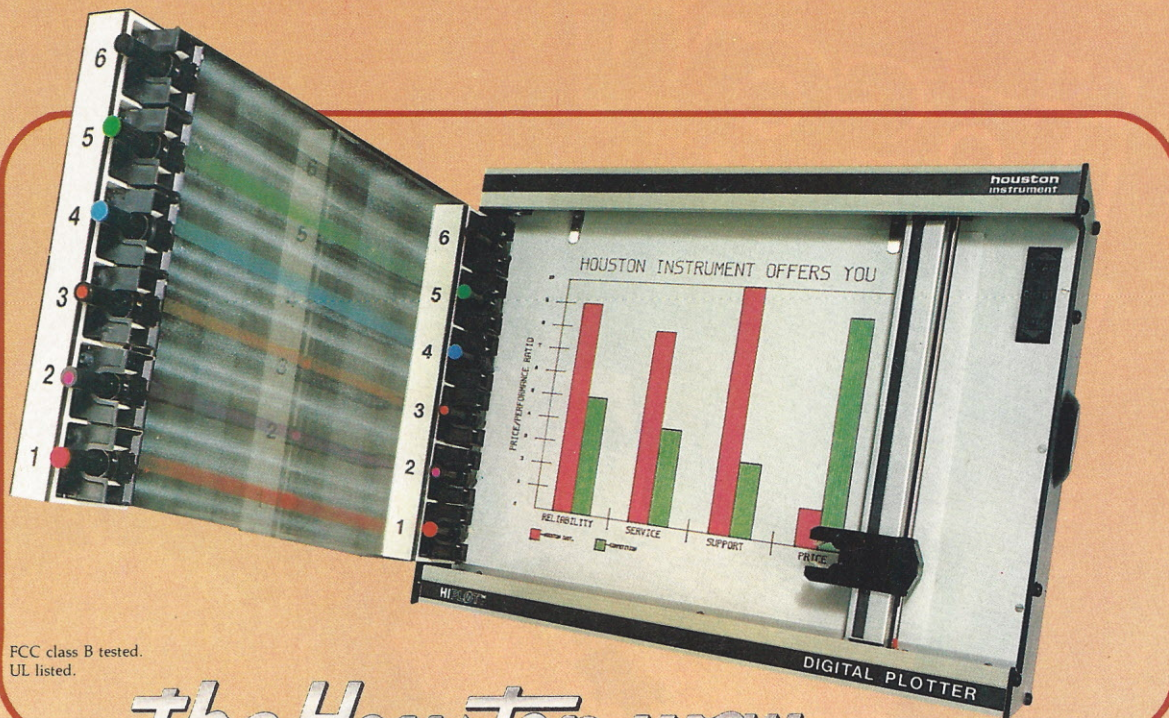
Thus, a large-memory, convenience-rich program would have both an introductory and a brush-up tutorial that would help you get started using the software and help you quickly relearn how to use it in case you had been away from it for a while and felt a bit rusty. It would also have shortcuts everywhere, so you could go straight to the instruction needed without having to grind through one all-purpose robotized teaching session. If the original tutorial would take 90 minutes to go through, the brush-up might take 10. Select Information Systems’ word-processing program (Kentfield, Calif.) does this with overlays. But if enough CP/M users elect to go to 128k and an extended CP/M system, then software houses like Select are likely to do a high-memory version.

Map a richer territory

Additional information gives you a richer map of the territory. For everything you use computers for, you can probably come up with a variety of “instrument readouts” you’d love to have, either on-screen or able to be called up at will. To continue our word-processing example, that would include word, line and character counts; status of the file(s) on disk, including a running “gas gauge” of space used up/remaining; a translation of the word count into how many pages would be if printed out in that the type size, letterspacing and overall format you’d keyed in—in general, anything in any kind of program that helps you preview how it will look and work in its final, out-in-the-world form.

One additional information form being used by some makers displays function key labels dynamically across the bottom of the screen. This beats paper strips laid on the key-

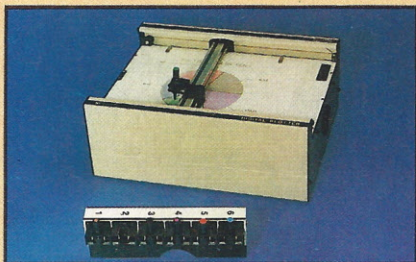
New from HIPLØT™ multi-pen plotting for as little as \$1480*.



FCC class B tested.
UL listed.

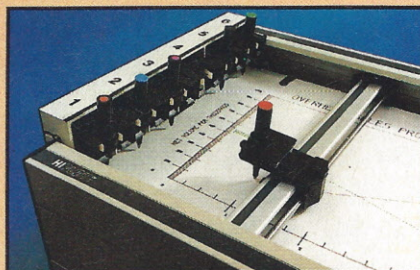
the Houston way

The new HIPLØT DMP Series 6-pen option makes high performance multi-pen plotting affordable. It's available on the DMP 2, 3, and 4 models in the HIPLØT family so you can enjoy the advantages of multi-colored plots on 8½" × 11" (DIN A4) surfaces. Of course, you also get the standard HIPLØT range of capabilities such as intelligence, controls, interfaces and resolutions. There's a model for virtually every plotting application.



Big Performance in a Small Plotter
Since its introduction, the HIPLØT DMP Series has been recognized as the innovative plotter

line which made low-cost, high performance digital plotting a reality.



Now, with our new 6-pen option, there's an exciting new dimension in the DMP Series' versatility. Imagine two standard models with RS-232-C and parallel interfaces, four intelligent models with RS-232-C or Centronics® compatible interfaces, a choice of controls, resolutions, and pen speeds. Add to this the ability to plot with 6-pens on paper, vellum or mylar (ideal for overhead projectors) and you have the ultimate plotter price/performance combination — the perfect choice for the user or OEM.

8-Pen Models Also Available.

If you need a little more capability, take a look at our new 8-pen option. It's available on the DMP 5, 6, and 7 so you can have 8-pen multi-colored plots on 11" × 17" (DIN-A3) surfaces.

Why wait? Let us send you complete information on this breakthrough in affordable, multi-pen plotting. Contact Houston Instrument, P.O. Box 15720, Austin, Texas 78761. (512) 835-0900. For rush literature requests, outside Texas, call toll free 1-800-531-5205. For technical information ask for operator #5. In Europe contact Houston Instrument, Rochesterlaan 6, 8240 Gistel, Belgium. Phone 059/27-74-45.

INSTRUMENTS & SYSTEMS DIVISION
Together...we'll create tomorrow.

BAUSCH & LOMB

TM Trademark of Houston Instrument.
* U.S. Suggested retail prices.
Centronics® registered trademark of
Centronics Data Computer Corp.

JIGSAW...A Mind Teaser

The First Computerized Jigsaw Puzzle



Spend fascinating, intriguing, challenging hours
of endless, hi-res entertainment... with JIGSAW.
Great for anyone and everyone.

Take your favorite computer picture and convert it into a puzzle. The program comes with 7 supplied pictures (full-color, hi-res graphics). Each puzzle breaks apart into 180 separate pieces. Never repeats the same sequence of shapes—each game you randomly generate a brand-new puzzle.

The pictures supplied by JIGSAW are designed for players of all skill levels. Total program written in machine language, permits fast loading, quick picture generation, rapid response. A super teaching aid for young people (for size, color, and shape relationships).

CAUTION: PLAYING JIGSAW MAY BE HAZARDOUS TO YOUR HEALTH.

The fun and excitement are infectious and you'll spend hours in front of your computer!

This Program was Written by Joe Calabrese. JIGSAW requires Apple II, 48K. Now available at your local dealer.

micro fun™
entertainment division
of micro lab

APPLE is a registered trademark of Apple Computer, Inc.

CIRCLE 36

Copyright 1982 Microfun.

SPECIAL REPORT

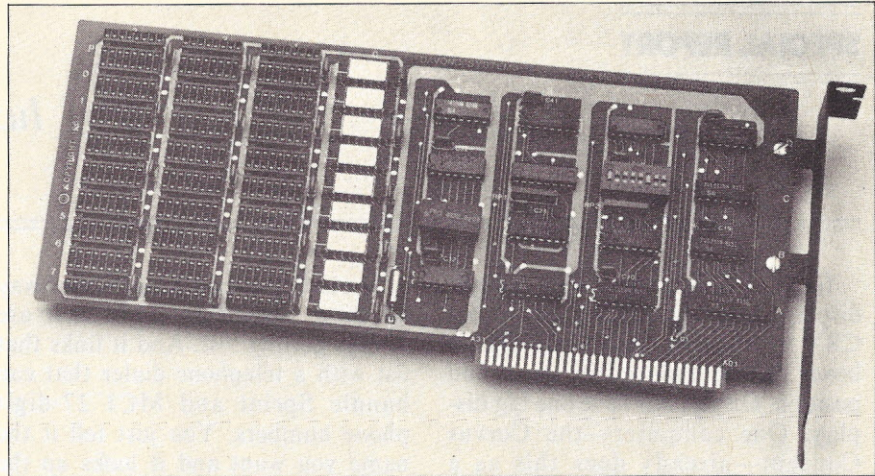
board, because dynamic labeling lets you shift to new labels as needed. When you choose one of the functions labeled, the program goes to that function and the key labelings on-screen change to a submenu indicating the functions appropriate to that particular task.

More memory can also help out when you say "Help!" Each piece of software you use could include a diagnostic module to get you out of a wide range of jams. Many problems result from user error. The error often lies in sketchy instruction manuals and software that just quits when you don't stroke it right. That's because the programming needed to account for all the wrong moves you could make takes a lot of time to write—and a lot of memory to store. As memory capacity gets larger, the more we'll be able to expect—and demand—the convenience of wrong-move programming.

Another convenience is having one command subsume a bunch of sub-commands. In RAM-limited programs, aids to ease like this have to be weighed against not including some valuable functions. It's comparable to a car with a large engine being able to handle a variety of power-consuming options without lowering overall performance. Many small cars are very sprightly when they're allowed to travel light. But strap on luxury features and they just die. Powerful high-level commands are the computing equivalent, along with the other things listed here.

From our viewpoint the highest-level command is a sloppy one and computer literal-mindedness is a prime cause of user hair-pulling. With an approximate-input function the computer doesn't just sit there and wait for you to put things exactly right. Instead, it goes halfway to meet you. Large memory can give room for approximate input as well as for master commands.

The Savvy adaptation for the Apple handles approximate commands



The DSI-EX64K from Davong Systems (Mountain View, Calif.) is a 64k RAM card that easily expands to up to 256k with the addition of individual memory chips.

now, for instance, using 48k RAM and a virtual memory system. Virtual memory is when you have a lot of program on the disk and the computer goes to it for what it needs all the time. You could think of it as a heavy-duty overlay design that works with both the program and your data. An Apple disk drive holds over 100k of magnetic memory. So if Savvy needed all that in a virtual memory system, you could get it from a RAM the size of two Apple disk drives (that's the size of the Apple III's maximum RAM, by the way). And the convenience of having a computer that actually tries to figure out what you want it to do would be even more convenient contained within a large on-board memory.

It may seem indolent to seek convenience features when most of us use computers for accomplishment more than entertainment. But busy people learn to use conveniences to let them focus on their highest-quality tasks. Still, once we've managed to handle our current level of productivity most efficiently, we then seek ways of accomplishing additional things. One of the first you should consider is wrapping all that RAM around existing minicomputer software.

A new way of doing things

Speed and convenience features of added-memory computing save time. Most personal-computer users use the saved time to tackle new or larger-scale tasks. Another way to save time by adding memory is to use the enlarged capacity to do several tasks at once.

Computers generally strive to elec-

tronically duplicate manual ways of doing things. Thus one early word processor had ratcheting knobs on either side of the CRT (Cathode Ray Tube). You'd use them to scroll the electronic display up and down.

Technological innovation often automates a prior way of doing something. Then the new capabilities get exploited and do things the older manual system couldn't. The first movies duplicated stage plays. Now the camera swoops around in even the most routine movie. Personal computing is generally still in the filmed-play stage, but really new ways of doing things hover on the horizon.

Possibly the most striking area is in multitasking. Human beings tend to do one thing at a time. Part of that comes from the way most people's minds work and computing can't change that. But it can change the ways in which given tasks are set up.

Most professionals make their livings doing a variety of tasks under given job descriptions. Each task often requires assembling the relevant files and apparatus. So we tend to do one thing at a time to economize on the trouble it takes to get in a position to work.

Computers are like that, too. Want to do spreadsheeting? Boot a spreadsheet program, get the right diskettes and do it. Likewise, for writing a letter or report, converting tabular data into graphics, communicating with remote computers, etc. But with more memory you can work on all of these at once, setting the computer to one or several tasks while you continue to enter data, organize and/or write.

**“Added memory
can give you a
luxurious, arms-spread-out
kind of feeling.”**

Imagine a computer with several displays, each represented on one big CRT by separate “windows.” These boxes can be changed in shape and position. Or you can have one big display. One computer—the Corvus Concept—already does this as a matter of course. And it has a large enough memory (256k standard, 512k possible—maybe more later) to run several software programs at once.

Let’s say you’re working on a report and need to do some calculations based on data in your database as processed by your spreadsheet, then turned into a graph and inserted into your report. Meanwhile the home office calls and wants something entirely different called up and sent to the other office via modem and telephone. You could open a bunch of windows and do it all simultaneously, meanwhile continuing work on your report. You wouldn’t even have to wait for the graph. You’d just put a marker in the report where you wanted it to go when it was done, and continue.

In other words, instead of spending what seems like hours each day organizing your work, you just DO it.

Being able to display enough to handle such a work flow requires large memory. It takes many bytes to control the shifting, multiple imaging with graphics, and text from different programs, all on screen at once. The Corvus has the hardware to do this kind of display, and others have or will have it shortly. We’re just waiting for the software.

Optimization with The Organizer

Beyond this is the concept of optimization, which is being espoused by Fred Kallopy of Conceptual Instruments (Philadelphia, Pa.). This company makes an expanded-memory Apple program called The Organizer. The Organizer is an integrated, multifunctional program designed for people managers—i.e., executives—and it needs a 64k RAM

to work. It lets executives stow away all those notes they make that are always getting lost. And it links that list with a telephone dialer that can handle Sprint and MCI 27-digit phone numbers. You just tell it the name you want and it looks up the person’s file, reads the phone number and dials it. It is linked to an appointment calendar and tracks important appointments, chiming (via the Apple’s speaker) an alarm to tell the user to look at the screen and see what it is he or she needs to do. Thus far we have an efficient combination of filing system and personal secretary. But Kallopy sees beyond that.

Kallopy holds that most business decisions are still being made seat-of-the-pants. He says today’s manager uses a lot of quantified data and formulas—then guesses his bottom-line decisions. With a massive amount of memory, Kallopy anticipates that a manager could feed every significant variable into the system on his desk—for, say, scheduling the vehicles in a 100-city trucking operation, or ordering components for a complex assembly line. It would then solve a very large number of simultaneous (interdependent) equations and come up with a bottom-line scheduling recommendation. Kallopy says the algorithms (problem-solving routines) exist today. They just have to be written into programs for large-memory small computers available to run them on.

Computer war games

There are unpredictable variables in any business operation, starting with the fleshy production units called human beings. But a computer running optimization software could take ranges of variation into account. The idea isn’t metarigidity, but the business equivalent of a fast-moving tank corps that, unlike Patton’s, never outraces its supply lines.

If hardware is the tank, than software is the supply line and it’s stretched a bit thin. Computing sys-

tems are highly evolutionary—especially software. Nothing is fixed—everything is being constantly updated, revised.

But updating software can be a bear. Small-computer software is often written in assembly language, very tightly. This packs it into the smallest RAM possible, but it’s hard to get into the program and revise it. Programs written for extended RAM, on the other hand, tend to be written in higher level languages that are much easier to get at when the author has a better idea—or finds a bug. Good programmers tend to have their time filled with creating programs—so users often have to wait for updates. And when you get used to a piece of software it can be desirable to stay with the commands and working style you’re used to—if revisions keep it competitive with newer programs.

Make sure, when you buy more memory, that you have at least one useful program that takes advantage of it. That way you’ll be a lot more patient waiting for everything else to come along. Hardware almost invariably precedes software, and the further you go beyond the average, the longer you may have to wait. Apple 64k software is becoming common now—especially professional-aimed programs. But 192k programs are few and far between. The only one we know of is VisiCalc with Saturn’s pre-boot (you boot the Saturn mini-program, and then plug VisiCalc in).

Besides software shortages other potential pitfalls include: making your machine incompatible with others it needs to interact with; pouring upgrade money into an obsolete machine you should replace, voiding your warranty; paying more for expandability in a computer when you don’t plan to use it, losing your respect for backups just because you have a big on-board memory, taxing your computer’s cooling and power supply systems, problems with physical fit, and suffering from gadgetitis.

10 reasons why you should call DataSource[®] for software...

- 1. Free Systems Analysis** We have developed a variety of self-administered analysis tools to help you identify those products best suited to meet your needs.
- 2. Competitive Prices** Our volume enables us to offer you prices which are consistently competitive. Compare for yourself, then call us toll-free 800-328-2260.
- 3. Express Service: 7 days per week, 24 hours per day** You can place orders any day of the week at any hour of the day or night. Your order will be processed and shipped within 24 hours for all products in stock.
- 4. Discount Structures** We offer significant discounts to any individual, organization, or user's group purchasing in quantity.
- 5. Key Account Program** For corporations and institutions, we offer a comprehensive program: volume discounts, complete maintenance packages with an on-site option, specially staffed technical support, tailored training programs and creative financing options.
- 6. Unconditional Money-Back Guarantee** We stand behind everything we sell. If you are not completely satisfied with your purchase, return the item within 60 days and receive a full refund.
- 7. Toll-Free Technical Support** We service what we sell. Our customers have direct access to our technical staff on a toll-free basis. 800-328-2260.
- 8. National Maintenance Network** We offer a variety of maintenance agreements for both software and hardware products. Call for more information.
- 9. Flexible Payment Options** We accept all major credit cards, checks, and money orders, as well as purchase orders from corporate accounts.
- 10. State-of-the-Art Software and Hardware** We carry a broad range of what we believe to be the best in software plus carefully selected hardware products and accessories. Here are just some of the products we carry and recommend...

Available Now From DataSource[®]

DBMS

dBase II - Ashton-Tate	\$495
Condor II - Condor	\$450
Selector V - Micro-AP	\$395
Data Star - MicroPro	\$225
Super Sort I - MicroPro	\$170

Spreadsheets

Super Calc - Sorcim	\$199
Calc Star - MicroPro	\$185
Visicalc - Visi Corp	\$159
Visicalc 256K - Visi Corp	\$205

Word Processing

Wordstar - MicroPro	\$289
Wordstar/Mailmerge - MicroPro	\$385
Mince - Mark of Unicorn	\$148
The Final Word - Mark of Unicorn	\$250

Languages

Pascal MT+ - Digital Research	\$425
PL-1/80 - Digital Research	\$420
Basic Compiler - Micro Soft	\$310
Basic 80 - Micro Soft	\$275
C Basic - Digital Research	\$125
CB 80 - Digital Research	\$420

Hardware

Smith-Corona TP-1	\$689
C. Itoh F-10	\$1,475
C. Itoh Pro Writer	\$515
C. Itoh Pro Writer-Serial	\$650
Hayes Smart Modem	\$230
Signalman MK I Modem	\$ 99

Spelling

Spellguard - Sorcim	\$225
Spellstar - MicroPro	\$165
The Word - Oasis	\$ 70

Business Application Modules

Structured Systems	\$850/mod.
Graham Dorian	\$710/mod.
Artificial Intelligence	\$750/mod.

NEW! Only from DataSource[®]

EMULINK for the IBM PC \$995.00
On-Line Binarysynchronous link to the big IBM host. Full 3270 emulation for the IBM Personal Computer. Complete documentation included with diskette and board.

Please include 3% for shipping and handling. Minnesota residents, add 5% sales tax. Prices subject to change without notice.

American Express
MasterCard
Visa

FOR MORE INFORMATION CALL TOLL-FREE

1-800-328-2260

IN MINNESOTA, CALL (612)-544-3615

DATA SOURCE[®]
systems Corp.

Your Source

DataSource Systems[®] Corporation, Dept. FA, 1660 So. Highway 100, Minneapolis, MN 55416



SPECIAL REPORT

Say you augment your Apple II to 64k and do VisiCalc on it. Your boss with his Apple III won't be able to read your files in Apple II emulation mode, which is limited to 48k. There is a solution to that, by the way. It involves using an Apple utility program to translate the Apple II files into Apple III-type files, which the Apple III's VisiCalc can then work with, and which the II's can't read. So you're still stuck if you need upward and downward compatibility. When you petition your boss for the extra memory you're excited about, remember to include every other machine whose diskettes and memories you swap stuff with in your proposal.

The wrong machine

Are you upgrading a computer you should be giving a gold watch and a rocking chair to? Some early personal computers are truly obsolete. If it's out of production, why not give it to the son with the mad scientist gleam in his eye instead? Other computers still work well but never caught on, so there isn't much software for them. Don't buy by specs and features—buy for utility and track record.

Yet other computers work well and have software, but the maker has gotten a reputation for coming out with new models incompatible with the old ones. Your system could be next! So look for makers with demonstrated user loyalty before you add memory (or any other upgrade). However, some types of personal computers use a standardized expansion slot design (like the S-100). If you get a new machine of the same slot design, you can often put your memory boards in it. You have to stay with the same bus design and sometimes with the same manufacturer, though.

Other wrong-machine problems: There are early S-100 (that's a semi-standardized expansion slot design) computers of wretched quality that no amount of upgrading will save, because they'll still be unreliable. Also, some "S-100" machines won't run

S-100 boards from other manufacturers properly. Make sure it works before you pay. On the other hand, Radio Shack Model III's and Apple II Plus' are a safe bet because there are so many of them. Even if new machines can potentially do this or that better, they have so much software available and their designs are so proven and well known, that you can expect years of utility. This is true, to varying degrees, of many other machines. A friendly chat with your dealer's repairman could be one of the smartest moves you could make.

Another wrong-machine problem is lack of headroom. If you know your uses will require 256k RAM in six months and your machine can only be expanded to 128k, maybe you should wait to get one that has the headroom you need.

Your warranty—remember?

If you break a seal (for instance, on Radio Shack cases) or solder things you can void your warranty. On the other hand, if you keep any parts you've replaced while expanding and restore everything back to factory configuration before you go in for warranty work, you should be OK. If you want full factory support, you can buy the factory expansion card or chips—if they make them. At the least, we strongly recommend buying your expansion memory from the same dealer you bought your computer from.

You rarely have to solder to add RAM, anyway. It's usually just a matter of plugging in chips or a RAM card, and sometimes pulling a chip on the motherboard and replacing it with some small device connected to the RAM card. That will void most warranties, all right, but since nothing is soldered nothing is irreversible. If you're worried, you have several options. One is to get a RAM card (like Mountain Computer's) that doesn't require swapping motherboard chips. The other is to

CALL YOUR LOCAL DYSAN OFFICE

CA:	Los Angeles (213) 907-1803 Orange County (714) 851-9462 Sacramento (916) 966-8037 San Francisco/Sunnyvale (408) 727-9552
DC:	Washington (703) 356-6441
GA:	Atlanta *(404) 952-0919
IL:	Chicago (312) 882-8176 (800) 323-5609
MA:	Boston (617) 273-5955 *(617) 229-2800
MI:	Detroit (313) 525-8240
MN:	Minneapolis *(612) 814-7199
MO:	St. Louis (314) 434-4011
NY:	New York (212) 687-7122
OH:	Cleveland (216) 333-3725
PA:	Pittsburgh (412) 261-0406 Philadelphia (609) 939-4762
TX:	Dallas/Ft. Worth *(817) 261-5312
WA:	Seattle (206) 455-4725

*Includes OEM Sales

Dysan Diskettes are also available from all ComputerLand Stores, Sears Business Systems Centers, and many independent computer outlets nationwide.

For the location of the Dysan sales outlet nearest you, contact Dysan at: (408) 988-3472

Toll Free: (800) 538-8133
Telex: 171551 DYSAN SNTA
TWX: 910-338-2144

 **Dysan**
CORPORATION

WHAT IS THE TRUE COST OF A DISKETTE?

If you said at least \$186.50*, you're probably close.

Confused? It's simple. The minimum cost of a one-sided, single density 8" diskette equals the purchase price plus the cost of the time to fully load the data onto the disc*. The adjacent diagram tells the story. As you can see, the purchase price of a diskette is a small fraction of the total cost of ownership. So why not pay a few cents more for the best diskette available?

That's where Dyan's quality comes in. Dyan diskettes and mini-diskettes are manufactured to the toughest quality standards in the industry. Every diskette is tested between the tracks as well as on the tracks to insure you 100% error-free recording over the entire disc surface. Dyan quality protects your investment of \$186.50.

You know how costly time and data losses can be should your "bargain" diskette be faulty. Every penny you think you save on the purchase of magnetic media could cost you dearly. Why take the risk when you can have Dyan?



dyan **Dyan**
CORPORATION

Our Media Is Our Message.

5201 Patrick Henry Drive
Santa Clara, CA 95050

*\$4.00 represents Dyan's suggested retail price for a one-sided, single density 8" diskette, packaged ten to a box. Minimum total cost of ownership = \$186.50

*\$182.50 represents the cost of data loading (approximately 22 hours at 11,106 keystrokes/hour at a labor cost of \$8.23/hour), based on 1981 Data Entry Management Association (DEMA) National Averages.

***“Busy people
learn to use conveniences
to let them focus on their highest
quality tasks.”***

get your dealer to warranty the whole expanded system himself. This works best if he's competent and authorized to repair your computer himself.

Unused expandability

Few who make highly expandable machines will remind you that the cost is there whether you use the the expandability or not. A number of high-performance personal computers do not lend themselves to expansion. But they cost less to design, build and maintain. Because they have fewer parts, their circuits don't have to be designed to coordinate with the variety of boards and gadgets you can stick in them. Thus the Apple is more expandable than the Atari, even though both have the same processor and basic specs. The Osborne, Cromemco C-10, and Xerox 820 all offer low prices for what they do, but that does not include much expansion ability. When you have more parts, more things can go wrong. Good complex computers (like Cromemco's high-end line, Tarbell, Vector Graphic) are engineered against this and are priced accordingly for this engineering. Some others are not.

You still have to back up

A motorcyclist will crash at some point. He has to plan for it. You will lose everything in your RAM at some point. And you have to plan for it. The bigger the RAM, the harder you'll fall.

Memory expansion devices usually go into your computer and draw power from the power supply. A few are outside and separately powered—no problem with them. Every computer's power supply has a limit, and it may be wise to find out just how much power each card you have in there draws and compare the total against the power supply's output. Some power supplies (like the Apple's) are very conservatively rated. But if your machines gets squirrely a power shortage might be the cause.

External power supplies are made for some machines (like the M&R for the Apple, or Mountain Computer's Expansion Chassis, which offers extra slots and a separate power supply). Transistors are susceptible to heat. Typically they perform OK until they blow, and then you have to replace them. Most heavy-duty machines have fans or massive heat sinks, and add-on fans are made for other popular makes. A RAM board does not by itself require extra cooling, but if your machine is already highly expanded it might be prudent to put a fan on. Check with your dealer on your own brand's idiosyncrasies.

You can buy RAM, like the mountain climber's credo, “because it's there.” Sometimes it's easier to get another goodie than to learn to really use what you've already got. We're not against impulse buying; it builds sales and lowers prices for the rest of us. The world would be a thin place without pioneers. Every time we buy hardware for which a full assortment of software doesn't exist, we're making a prediction about the future, varying from a pretty sure bet to a pretty ridiculous assumption.

Now you've seen the landmines. The most serious is buying more memory and assuming that software to run it automatically exists, and has no hitches. This is still a new business, and you may have to invest some time and trouble to get what you want. The second most serious pitfall is expanding a machine you should give to someone.

What's available now

If you want more memory now, you can get it via chips, cards, boards and boxes. They are available for machines designed to expand and for ones being put to uses the original maker never intended. There is a trend toward combining extra RAM with other functions on the same card. This conserves expansion slots and often power requirements as

well. Cards are coming out with as many as four or even five different kinds of hardware on them—often including RAM.

Extra memory generally costs from .4 to 1.4 cents per byte, with the larger memories usually running a bit less per byte. Prices range from tens of dollars for chip sets, to \$100 for low-cost computer cartridges and cards, to \$100 to \$225 for 16k cards, to a \$1000 or more for big disk emulators with 300k or more. S-100 64k boards cost from \$225 to \$1000. The cost per byte is about the same, whether the form is electronic (RAM) or magnetic (disk drive) memory.

Generally, cheap, turnkey machines—for a given level of performance—have limited expansion potential. Apple, Commodore, Corvus, DEC, IBM, NEC, the S-100 machines like Vector Graphic, and Zenith all offer machines that are quite memory-expandable. Peripheral manufacturers focus on memory products for the most popular of these at any given time. Makers including memory products in their lines include Mountain Computer, Davong, Microsoft, Tecmar, Axlon and Memotech. Memotech is unique in offering a 64k stick-on memory for the tiny Sinclair.

There are some related products, too. Print spoolers with dedicated RAM are offered by Quadram and Practical Peripherals. You can only use their RAM to make printers more “intelligent” (so they can print while you use the computer for editing).

While many RAM cards can be used with suitable software as disk emulators, some devices (like Axlon's 320k box) are hard-wired as disk emulators. Again, it's a specialized application of RAM—maybe it should be called DAM (Dedicated Access Memory)—but it's so useful and you don't need to wait for software. The Axlon has an uninterruptible power supply for its own RAM, though it

Introducing the Most Powerful Business Software Ever!

TRS-80™ (Model I, II, III, or 16) • APPLE™ • IBM™ • OSBORNE™ • CP/M™ • XEROX™



The VERSABUSINESS™ Series

Each VERSABUSINESS module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

VERSA RECEIVABLES™

\$99.95

VERSA RECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement-generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSA RECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSA LEDGER II™ and VERSA INVENTORY™.

VERSA PAYABLES™

\$99.95

VERSA PAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSA PAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSA PAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

VERSA PAYROLL™

\$99.95

VERSA PAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government-required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSA LEDGER II™ system.

VERSA INVENTORY™

\$99.95

VERSA INVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSA INVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSA RECEIVABLES™ system. VERSA INVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

VERSA LEDGER II™

\$149.95

VERSA LEDGER II™ is a complete accounting system that grows as your business grows. VERSA LEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system **without any additional software.**

- VERSA LEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSA LEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSA LEDGER II™ manual will help you become quickly familiar with VERSA LEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

SATISFACTION GUARANTEED!

Every VERSABUSINESS™ module is guaranteed to outperform all other competitive systems, and at a fraction of their cost. If you are not satisfied with any VERSABUSINESS™ module, you may return it within 30 days for a refund. Manuals for any VERSABUSINESS™ module may be purchased for \$25 each, credited toward a later purchase of that module.

To Order:

Write or call Toll-free (800) 431-2818
(N.Y.S. residents call 914-425-1535)

- * add \$3 for shipping in UPS areas
- * add \$4 for C.O.D. or non-UPS areas
- * add \$5 to CANADA or MEXICO
- * add proper postage elsewhere

DEALER INQUIRIES WELCOME

All prices and specifications subject to change / Delivery subject to availability.



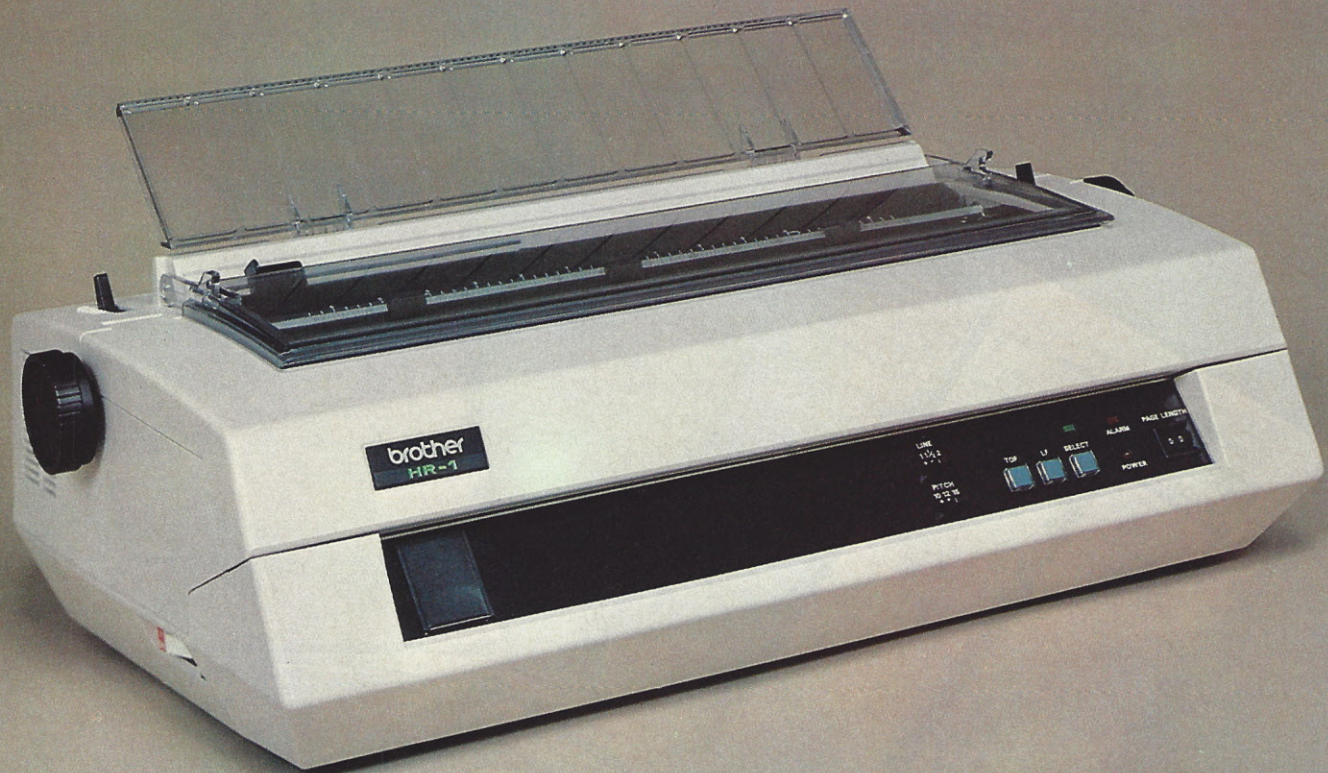
COMPUTRONICS

50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10977

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp. • APPLE is a trademark of Apple Corp. • IBM is a trademark of IBM Corp. • OSBORNE is a trademark of Osborne Corp. • CP/M is a trademark of Digital Research • XEROX is a trademark of Xerox Corp.

CIRCLE 38

brother®



Inexpensive – Yes! Incomplete – Never!

Dynax introduces its newest family member, the BROTHER DAISY WHEEL PRINTER HR-1.

Designed especially for word processing applications, the BROTHER HR-1 turns out a stunning performance that even the bigger more costly names cannot match. Built to uncompromising standards of engineering excellence, we know what is expected by people in business, professional offices and schools, and therefore have not compromised any features for cost.

The BROTHER HR-1 with its one touch interchangeable cassette-type daisy wheel and ribbon, offers ease of operation never before obtainable in a low cost printer. And our HR-1 printer operates with microprocessor technology, reducing operating parts to assure the durability and reliability you demand.

The BROTHER HR-1 offers unparalleled excellence in clear, clear and crisp quality printing for even the most demanding business correspondence. And it handles your memos, forms and reports with equal ease and reliability at a price attractive even for personal use. Your HR-1, with bi-directional printing, can handle paper to 16.5" wide and is designed to interface with QUME SPRINT 3, RS-232C and CENTRONICS parallel.

So why not let our new family member become a member of your family? For complete details and a demonstration, see your nearest dealer or write to us direct.

Manufactured by

BROTHER INDUSTRIES, LTD.

35, 9-Chome, Horita-Dori, Mizuho-Ku, Nagoya, JAPAN

Distributed by

Dynax

A DIVISION OF KANEMATSU-GOSHO (U.S.A.) INC.
333 South Hope Street, Suite 2800, Los Angeles, CA 90071

CIRCLE 41

SPECIAL REPORT

“Instead of spending what seems like hours each day organizing your work, you just do it.”

doesn't protect the RAM of the computer proper.

Add the RAM yourself?

We believe you should add RAM yourself whenever possible. Manufacturers like you to have the dealer install chips and cards, if for no other reason than if you use incorrect or low-quality products (or botch the job), they don't want you blaming them for the results. But that's their problem. Yours is to become confident with computing. It's comparable to learning how to do very minor work on your car—the worth isn't really in saving the cost of someone else's labor. It's in the sense of mastery and competence such work gives you with the computer, or car, or whatever. You don't have to become a hobbyist to stick a card in, and it's not difficult.

Can my software use the RAM?

A chart sufficient to fully answer that question would fill a book and be outdated before the type was set. But we've included a sampler chart listing some software firms making products that can take advantage of extra memory. Some categories of software are especially memory-hungry—like spreadsheets, data-base managers, and word processors oriented to long reports and articles. The makers of added memory hardware should publish lists of software that use their product. Call or write them and say you want it. If enough of us do they'll provide it.

As a rule of thumb, every category of software includes programs for the casual to the serious user, and the latter is the place to look for high-memory software. The fact that the IBM and Apple III can be configured with a large memory has spurred competitors (notably Commodore) and software makers to jump. We think you'll see significant programs using a lot of RAM by next year. It's limited now, as we've said, but we've also pointed out some programs (no-

tably spreadsheets, The Organizer, program compilers, and disk-intensive data-base managers using disk emulation) you can use now.

Context Management System's program purports to do for the manager what The Organizer purports to do for the executive—to be the one program the user uses, keeping it fired up on an ongoing basis. The MBA is aimed at MBAs and their ilk. It requires a 256k IBM.

That 256k gets you the five functions managers use most (word processing, data-base management, electronic spreadsheet, business graphics and telecommunications)—all in the RAM at once, with one set of integrated commands for the works.

It would take much more than 256k of program and data space to have each of those five functions as powerful as specialized, single-purpose programs. The word processor, for instance, has 13 commands as opposed to the 50 to 70 found in some others. But few managers need the kind of word processing a production typist needs, and don't want to have to learn all those commands in the first place—or relearn them every time they want to key in a quick letter.

MBA is a practical, available-right-now program that needs 256k of RAM to work right. If enough IBMs come to have larger memories, MBA's creators are ready to do a 512k version with more features, speed, data space, as is Conceptual Instruments' (makers of The Organizer), and most other software-producing firms.

While waiting for the software you want there are other ways to get at the benefits of added memory.

Large-capacity disk drives (especially hard disks), offer much faster disk access than floppies because they spin so much faster. They reduce I/O waits. Their costs start at \$2000 for 5M drives and go straight up from there. Your software just won't use all that. Without some changes, the


average program will treat the 5M like a regular floppy and give you DISK FULL messages when it's put a floppy-full of information on it. Legally, you can't place copy-protected programs on hard disks. Do it illegally and you lose factory support. It's best if you regard hard disk drives as another, expensive system upgrade you can contemplate. We certainly like them. They're just not a panacea.

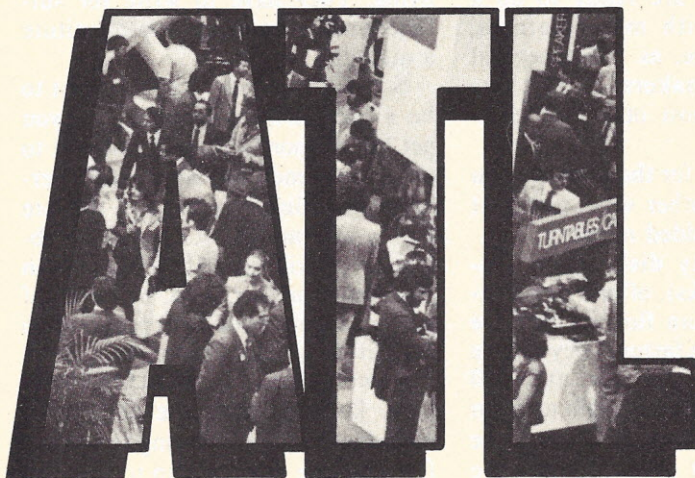
Rewards for the intrepid

You can do it if you try, as the song says. We don't promise that memory expansion is the easy way to go. Pioneers travel rocky roads, after all. But we hope you now know the bumps and the Beulah land you're working toward.

You must decide whether to pop for added memory now. Tempting as our dreams are, that humble burro of a system you've got is reliable, sure-footed and a sight better than walking. But we have one last conceptual argument to make in favor of added memory.

The programmers—all of them, from Microsoft's think tank in Bellevue, Wash., to some bright teenager creating the future in his dad's basement in Piggott, Ark.—are looking at you to see what you'll do. If you, collectively, buy more RAM, be assured they will write to it. They're dying to, but they, like you, have to make a living. They have to write for sufficient numbers of users to constitute a market.

So added memory may turn out to be a self-fulfilling prophecy. If you get the memory and brag about it to all your friends and associates (perhaps skimming over some of the late nights you put into solving the problems) you will have that Pegasus on your desk quicker. And, by virtue of your pioneering you'll be prepared to exploit it quicker than your more truculent peers. You may even be able to keep up with the computer-confident kids just starting to emerge from college now. It's up to you. 



SHOWS FOR YOU IN '82

THE NATIONAL COMPUTER SHOWS are the largest public computer expositions in the country. They feature hardware and software for business, industry, government, education, home, and personal use.

Under one roof you'll be able to test the new computers, desk top computers, data and word processing equipment, and a huge array of computer peripherals, computer services and computer supplies.

At each show you'll see all the major brands, all the major manufacturers, the big distributors and the local dealers and retailers. Everything together and for sale at super show prices.

Don't miss the National Computer Show coming to a city near you. Admission is \$5 per person per day.

TICKET INFORMATION:

Send \$5 (payable to National Computer Shows) for each day-long ticket along with the name of the Show you plan to attend to the address below. Tickets can also be purchased at the show.

The National Computer Shows,
822 Boylston St., Chestnut Hill, MA 02167
Telephone: 617-739-2000

BOSTON

THE NORTHEAST PERSONAL COMPUTER SHOW

Friday-Monday October 8-11 (Columbus Day Weekend)
Hynes Auditorium/Prudential Center
Show Hours: Friday 11 am to 9 pm,
Saturday & Sunday 12 noon to 9 pm,
Monday 11 am to 6 pm

WASHINGTON, D.C.

THE MID-ATLANTIC COMPUTER SHOW

Thursday-Sunday October 28-31
D.C. Armory/Starplex
Show Hours: 11 am to 6 pm daily

BOSTON

THE NORTHEAST BUSINESS COMPUTER SHOW

Thursday-Sunday November 11-14
Hynes Auditorium/Prudential Center
Show Hours: 11 am to 6 pm daily

ATLANTA

THE SOUTHEAST COMPUTER SHOW

Thursday-Sunday December 9-12
Atlanta Civic Center
Show Hours: 11 am to 6 pm daily

THE NATIONAL COMPUTER SHOWS

822 Boylston St., Chestnut Hill, MA 02167

MEET THE WIZARD OF WALL STREET



Standard & Poor's STOCKPAK system can turn any investor into a whiz

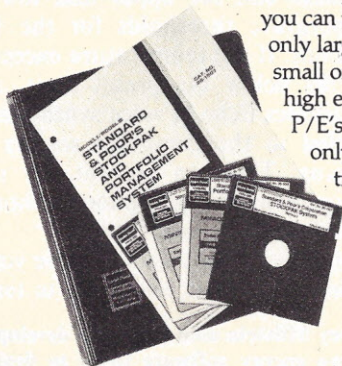
Whether you're an active investor, or just considering the best ways to invest, STOCKPAK can turn you into a Wall Street Wizard.

Sophisticated software that's easy to use

STOCKPAK is a sophisticated software system that offers you an easy and economical way to obtain and evaluate important investment information to help you make better investment decisions. In fact, in virtually no time at all, you can put STOCKPAK to work for you performing a wide range of investment functions.

Screening power is at your command

Our Screen and Select system lets you apply your own investment criteria to a 900-company database. For example, you can tell STOCKPAK to find only large companies, or only small ones...only those with high earnings growth, or low P/E's, or high dividends...only those in certain industries, or on specific exchanges...only those above or below a certain price...or only those with high sales, or low debt, and so on.



In fact, you can draw from over 200 specific information items to compose a single screen. And, you can establish your own targets and cut-off points in each of these 200 areas. STOCKPAK will oblige by searching through the entire database to find only those companies that satisfy your criteria.

More feats of wizardry with STOCKPAK

Standard & Poor's time-tested software also lets you evaluate and manage actual or hypothetical portfolios of up to 100 stocks each. And, you can create your own customized reports—displayed the way you want them.

Whether you use STOCKPAK to help improve your investment decisions, or just for the fun of it, it's good to know the source of this wizardry: Standard & Poor's, one of the world's leading financial publishers with a 120-year reputation of service to the investment community.

Visit your local Radio Shack Computer Store today

STOCKPAK is designed exclusively for use on the TRS-80 Models III and I computers with 32K business systems and two disk drives. The basic software and sample database plus complete documentation is available from your Radio Shack computer store for only \$49.95. The STOCKPAK monthly updating service can be ordered directly from Standard & Poor's for only \$200 annually. Visit your local Radio Shack today for additional information and a demonstration.

STANDARD & POOR'S CORPORATION
25 BROADWAY, NEW YORK, N.Y. 10004

© STANDARD & POOR'S 1982

The Smart House Comes Of Age

From solar power to energy conservation, personal computers are taking some of the exotic ideas that came out of the 1970s' energy crises and putting them within reach of the innovative homeowner

by Mike Barlow

You've heard of smart bombs and smart terminals, right? Well, get ready for smart houses.

Houses that think? Yes, thanks to personal computers programmed to react as weather conditions change, as people enter or leave a room, or as the temperature of a hot tub gets too hot for comfort. It may sound like some overzealous engineer's idea for an electronic dreamhouse, but don't be misled. The so-called smart house is becoming more common as its potential for saving money through efficient energy management is cultivated.

There's a new breed of personal-computer users taking advantage of a wide array of hardware and software configurations designed to monitor and analyze energy use in the home with an eye toward cutting utility costs. And they're not only using their computers to save money on the traditional forms of energy, the fossil fuels. They're also putting them to work designing solar- or wind-powered homes as well as retrofitting older homes with all kinds of exotic energy-related devices.

Take the case of Russ Coffman. When he wakes up on a cold winter's

morning in his solar-heated home near Denver, Colo., his Apple II Plus has already raised the shades, allowing sunlight to begin warming the seven-room house. And from that point on, the computer "stands guard" over fluctuations in temperature. Through a network of sensors, the Apple monitors all temperature changes, and when the house gets colder, the computer turns on a fan to circulate air that has already been heated in a solarium on the south side of the home.

At night, the Apple switches on a bank of exterior security lights, but keeps them dimmed to conserve energy. However, the computer is programmed to turn the lights back to full-intensity if an intruder is detected by the array of infrared and ultrasonic sensors implanted around the property.

And there's more, some of it leaving the realm of necessity and going off into luxury. If Coffman takes the week off to ski, the Apple turns down the heat in his hot tub for that week, and turns it back on a few hours before he returns.

So with all his energy worries apparently covered by his Apple, Coffman, a former computer salesman, has had more time to think about marketing some of the ideas that went into the building of his

smart house. He has developed a software package called Tomorrowhouse, for energy-conscious homeowners. In selling this product, Coffman is banking on the hope that the energy crises of the 1970s have worried the nation enough that it will act on its annually spiraling fossil fuel bills.

A computer warning

Tomorrowhouse, for the Apple computer, enables its users to display on the monitor the on or off state of lights and appliances, the temperature readings of 16 locations around the house, and daily temperature range data—high/low temperatures and the times they occurred—for each of these sites. Additionally, the user can set upper and lower temperature thresholds for the 16 locations. If the temperature exceeds or falls below the preset limit, an Electronics Echo II voice synthesizer coupled to the computer sounds a warning. This can prevent, for instance, sensitive greenhouse plants from dying on a cold night.

And if you don't want to leave your warm bed on that cold night to tend

Jeffrey Milstein used programs developed by two energy software firms to design this sunspace for his N.Y. home. In his office there (inset), he runs simulations and analyses for other solar projects.

Mike Barlow is a journalist from New York State who writes regularly on business and science topics.





to the greenhouse plants, Tomorrowhouse—when equipped with a 48-channel interface board and some add-on circuitry—will instruct the Apple to control the heating of that site, making adjustments every half-hour as it surveys the temperature sensors.

The user can also create seven, 24-hour temperature “profiles” for the house, with up to 48 adjustments per day. This way his home can be set up to react to his schedule. For instance, the profile can instruct the computer to reduce heating to minimum levels on Tuesday when no one will be home, and restore the heat on Wednesday when the family returns. “With this system, you can always come home to a warm house and a hot bath,” Coffman says.

On the computer monitor, Tomorrowhouse shows a high-resolution graphic of the home’s floor plan, and details the sites where electrical appliances or temperature levels are being monitored. With the addition of a second disk drive, a year-long

John Hardie at his Boston solar home (above left). Using energy software in his office there (below left), he sends solar building information to hand-held terminals taken to the construction site.



“A Yardley, Pennsylvania solar home is a mixture of Rube Goldberg’s designs and Stephen Spielberg’s special effects.”

record of temperature variations and system responses can be compiled, creating a data base for future study. Coffman projects that the system, which costs \$3200 without installation, can cut home energy costs by as much as 30 percent annually.

Earlier this year, Denver developer Britt Blaser met Coffman, watched the Tomorrowhouse program in action, and was so impressed that he drew up plans to include the system in each of the 120 solar-heated townhouses he’s building on 14 acres in nearby Littleton, Colo. But Blaser wants to take Coffman’s system a step further. He plans to link up the Apple computers located in each townhouse to the Corvus Omninet network, and monitor and control energy consumption at the development on a multiunit scale.

Selling technology and shelter

A graduate of Wesleyan University in Middletown, Conn., Blaser bills himself as a developer of solar-heated, energy-independent luxury homes. He feels that he’s on the cutting edge of a new kind of housing industry. “We’re selling technology as well as shelter,” says Blaser. “Most heating systems in America are designed on the premise that the average home is full of leaks. For years, the solution has been to blow hot air into the house faster than it leaks out.” But with fuel costs skyrocketing, those energy-wasting solutions are no longer feasible or even conscionable, he says. “Instead, we have to rely on new information and ideas to help heat our homes. We can’t continue to just throw materials at the problem.”

Blaser’s homes are of the double-wall or envelope variety. The heavily insulated homes are “ground coupled” so the earth itself acts as a thermal collector, storing heat energy and keeping interior temperatures from fluctuating more than 10 degrees year-round.

“Ever notice how your basement is

warm in winter and cool in summer? That’s because the earth is always about 55 degrees, no matter what the temperature is like above it,” Blaser explains. The result of the earth-coupled, double-shell design is to effectively wrap the basement around the house, virtually eliminating the need for heating in the winter and air-conditioning in the summer.

But this design alone is only 85 percent effective. All that’s needed to achieve that last 15 percent, Blaser says, is Coffman’s contribution—a computer programmed to monitor temperature fluctuations and to make appropriate responses.

For most of the winter, a passive solar greenhouse with a southern exposure provides all the heat energy needed to maintain Blaser’s homes at a comfortable temperature. But if the weather remains extremely cold and cloudy for several weeks, ground temperature will drop and cooler air will begin circulating in the space between the home’s inner and outer walls.

That’s when the computer takes over, Blaser says, opening vents and turning on a fan that blows hot air from a sun scoop atop the house into the cavity between the walls. This warms the house with only a minor expenditure of energy. “The emphasis is on brains rather than resources,” Blaser adds.

A touch of Goldberg & Spielberg

By most people’s standards, the Tomorrowhouse concept is the kind of idea that is still reserved for futuristic fantasies. But not by Joe Winegardner’s criteria. Winegardner, a professional energy management consultant, lets a Hometech 80-85 personal computer do his energy thinking for him. And the way his house works makes Coffman’s design seem primitive by comparison.

Winegardner is a former Western Electric engineer who designed computers for industrial control applications. He spent \$8200 to integrate the

Hometech into his 14-room home in Yardley, Pa., and the results are a mixture of Rube Goldberg’s designs and Stephen Spielberg’s special effects.

When the smoke alarm goes off in Winegardner’s home, the heating system shuts down, the exit lights go on, and the drapes open to allow easy exit from the house. On the other hand, if the burglar alarm is tripped, all the lights in the house go on, the drapes and roll shades close, dialer alerts the police and a video monitor in Winegardner’s room shows him exactly where the break-in occurred.

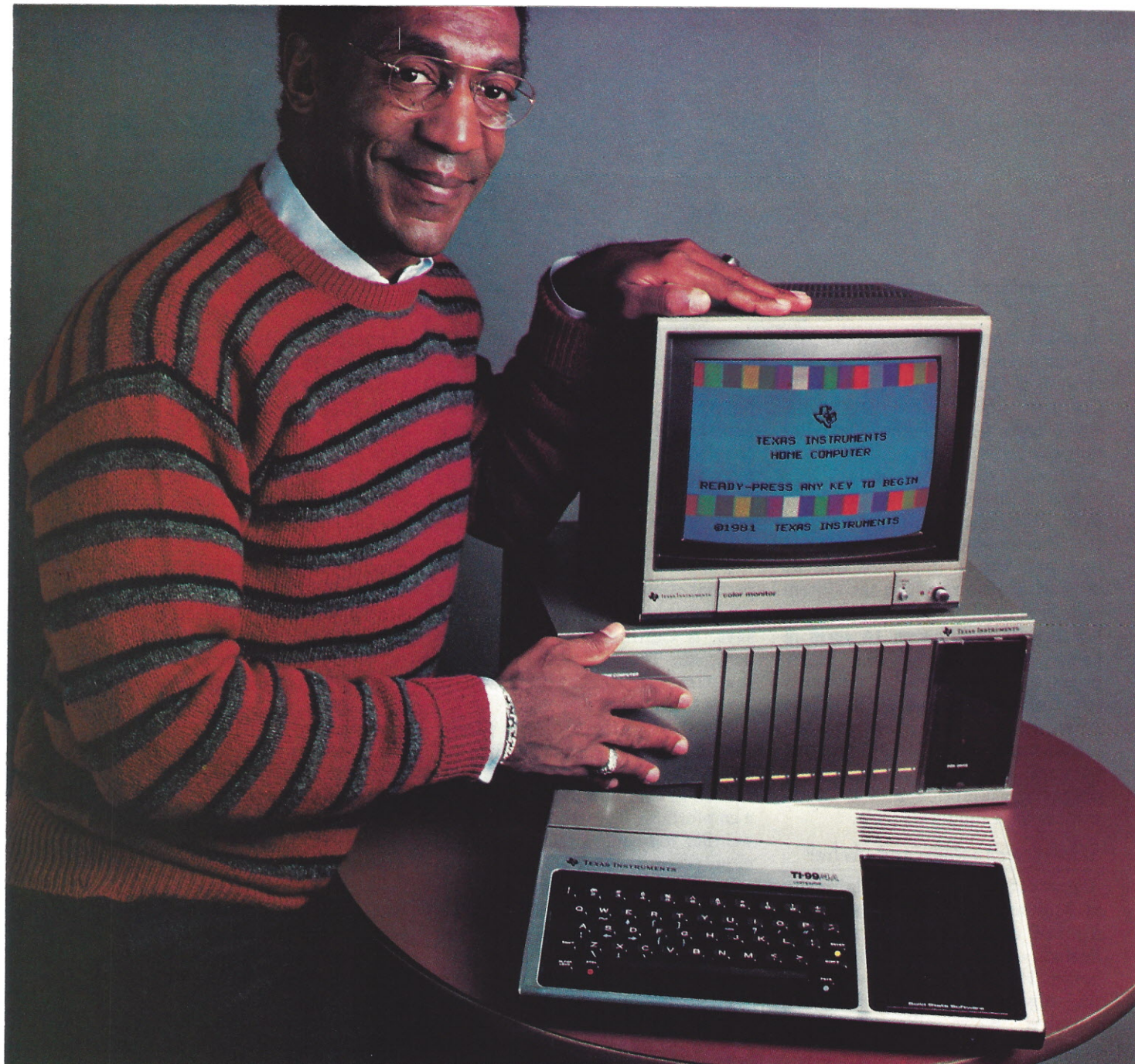
Utility bills lowered

And that’s just the start of a litany of tasks that the computer takes on. It keeps the hot water heater turned off except when Winegardner takes a shower or does the laundry, which results in an energy savings of 37 percent annually. It also determines when it’s best to start moving air warmed on the south side of the house into cooler rooms. Photocells keep the computer from turning on house lights until it gets dark, and motion detectors make sure that lights are off in unoccupied rooms until someone enters. Moreover, the computer is programmed to turn down the heat at night and not turn it back up until 30 minutes before it switches the stereo on in the morning—the stereo awakens Winegardner and his wife.

With the help of his personal computer, Winegardner says, his utility bills are 50 percent lower than those of his neighbors. But he cautions that before installing a system like his in the average house, a homeowner would be wise to consider his economic condition carefully.

“If you have limited funds for investment, it’s best to put the money elsewhere,” Winegardner says. “If you’re looking for a six- to eight-year payback, it’s just not that interesting.”

Solar industry consultant Jon



"TI's Home Computer. This is the one."

A lot of computers offer a lot. Only one in its price range offers the most. The TI Home Computer.

Better to begin with. Anyone can start right away with our Solid State Software™ Command Cartridges. Dozens of programs are available in home management, education and entertainment.

Easy to expand. Our Peripheral Expansion System gives you plug-in cards for memory expansion, P-Code capabilities, a disk drive controller and the RS232 Interface. You can also add a modem, speech

synthesizer, disk drive and 80 column dot matrix printer.

Programming flexibility. TI BASIC is built into the Home Computer. But it can also handle TI Extended BASIC, UCSD Pascal* Version IV.0, TI LOGO II, TMS 9900 Assembly Language and TI PILOT. Programs can be stored in the optional Mini Memory Command Cartridge.

High-Tech specs. 16-bit microprocessor, 16K bytes RAM (expandable to 52K). 26K bytes internal ROM, up to 30K bytes external ROM. 3 simultaneous tones from

110 HZ to 40,000 HZ. High resolution video. U. & I.c. Single line overlay for 2nd function. Control & function keys. 16 color graphics with 4 modes & sprites.

Sound impressive? Compare a TI Home Computer with the competition and really be impressed. You won't even need a computer to tell you this is the one.



TEXAS INSTRUMENTS

© 1982 Texas Instruments

*UCSD Pascal is a trademark of the Regents of the University of California

CIRCLE 5

"This is the cutting edge of a new kind of housing industry that's selling technology as well as shelter."

Hardie agrees with Winegardner's assessment. As President of Dequid Associates, a Boston-based firm that specializes in marketing management, computer analysis and sales strategy for solar projects, Hardie believes that personal computers have the potential to save enormous amounts of resources, but only if their powers are harnessed wisely.

Using a personal computer to monitor and control energy use in a home that has not been designed with conservation in mind is likely to be an exercise in futility, he says. Instead, why not attack the problem at its root by using the computer to help redesign the house?

Optimizing solar plans

Many homes, Hardie notes, aren't properly oriented to receive the full thermal benefit of the sun's warming rays. However, he adds, often a design that appears impractical can be turned into an energy-saver with simulated testing on a personal computer. So, using software developed by the Princeton Energy Group (PEG), an energy think tank at Princeton University, and Solarsoft, a software house based in Snowmass, Colo., Hardie runs simulations and cost-benefit analyses designed to optimize his clients' solar plans.

He runs the programs on a 64k Apple II Plus outfitted with three disk drives. The Apple is tied by modem into a 68k Pixel 100AP "super mini" made by Instrumentation Laboratories of Andover, Mass. Completing Hardie's set-up are a Wantanabe six-pen flatbed plotter, an NEC Spinwriter and an Epsom MX-100 printer. Hardie's clients take to the construction site IXO hand-held microterminals, which allow direct communication between the site and the computer in Hardie's office. This way clients can run the simulation program as they are going through the process of constructing the homes. Moreover, if any advice is needed, they can call Hardie

up and ask him to explain the data that just came over the computer.

And standing in the sunspace of Hardie's home in Arlington, Mass., a suburb of Boston, it's not difficult to believe that the marriage of high technology and common sense has finally been consummated. "Every square-foot of south-facing glazing equals a gallon of oil saved," beams Hardie, who delights in showing guests the results of his labors.

Beneath the floor of the sunspace are 27 tons of fist-sized rocks which act as a thermal sink capable of storing 1.3 million BTUs of heat energy. Sitting on the floor of the sunspace are 14 67-gallon Kalwall tubes of water that store a total of 700,000 BTUs. When the outside temperature rises during the day, the sunspace is prevented from becoming intolerably hot by the rocks and water, which trap a good deal of the incoming heat. When the outside temperature drops at night, the stored heat becomes available to the rest of the house. "I've got two million BTUs, roughly the equivalent of 22 gallons of oil sitting here, and it's all sun-fired energy," says Hardie.

Hardie did the computations that led to the design of his sunspace by hand, a tedious process that took several months. Now he uses a PEG program called Microfix to design similar projects for his clients in a fraction of the time.

One of four personal computer programs developed by PEG, Microfix simulates air and mass temperatures in a sunspace on an hour-by-hour basis over a period of days. The program, designed specifically to help professionals and do-it-yourself sunspace builders, also yields figures on hourly excess heat, a daily summary of total heat loss, and the maximum air-flow rate needed to remove the excess heat each day.


"Microfix is a very good program to cut your teeth on," says architect Jeffrey Milstein. He used the PEG and Solarsoft programs to help de-

sign the sunspace for his house in Woodstock, N.Y. The design was so successful that he offered do-it-yourself plans through the mail at \$11 a copy, and received 1300 requests.

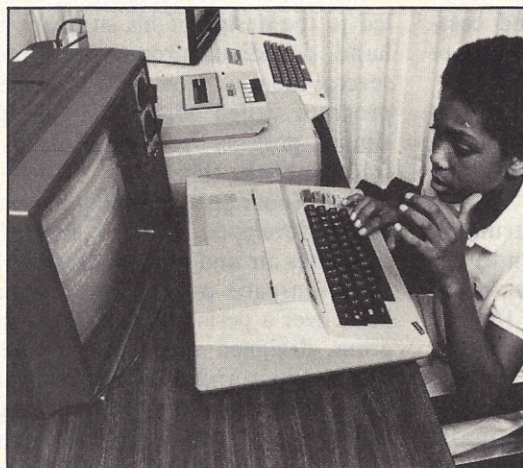
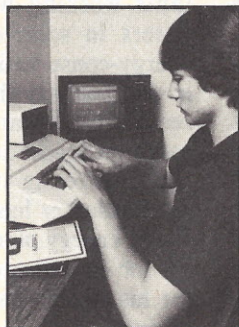
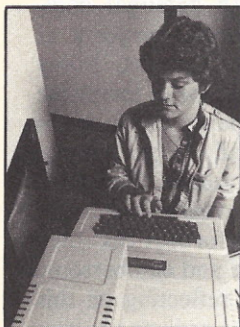
Solar construction scenarios

To calculate the temperature shifts that would occur in his sunspace, Milstein used a Solarsoft program called T-Swing. The program allowed Milstein to play out a variety of "what-if" solar construction scenarios. For example, he could plug in different thermal masses and interior dimensions for the sunspace, and the computer would graph temperature swings for each range of variables over a 24-hour period.

With another Solarsoft program, Solgain, Milstein determined the ideal length and height of window overhangs at his home. A well-designed overhang can prevent 90 percent of the sun's energy from entering a window during the summer when the sun is high in the sky, and allow 90 percent of the sun's energy to enter a window during the winter when the sun is low. "Solgain lets you plot graphically the sun's angles hour by hour, and lets you see the solar energy gain hour by hour," Milstein says. "It's very impressive."

That last statement is heard more and more from architects and consultants working with personal computers in solar-energy projects or energy-conservation systems. Many in this field say that one of the prime reasons that solar power has failed to catch on dramatically is, put simply, poor marketing strategies. The average consumer has avoided seemingly exotic energy plans for fear that they are too complicated and cumbersome for his needs. But reflecting on this recently, these same experts are now saying that the personal computer, with its ability to simplify information and work in tandem with its users, could be the push that the solar-energy industry has waited for to make it marketable. 

Why does EDU-WARE bother to meet individual needs?



Have you ever met an "average" learner? The reality is that every learner brings to the curriculum at hand a distinct combination of skills—at any age, in home or classroom. Given the reality, solutions to learning needs must somehow focus on the individual.

Edu-Ware focuses on the needs of the individual learner. Use its Computer Based Instruction (CBI) to achieve specific learning objectives:

Accelerate—Gifted students need opportunities to advance beyond their classmates. Edu-Ware helps them follow their own pace and ensures continuing motivation.

Remediate—Deficiencies in core skills sometimes limit a learner's success in an entire subject. Edu-Ware can be fine-tuned to the

individual's abilities in distinct skill areas; give the right feedback at the right time; alleviate frustration.

Reinforce—Learners sometimes run into hurdles in their work which they need help to bridge. For them Edu-Ware's benefits are 1) precise definition of skills taught in each system and 2) a patient, non-threatening approach.

Refresh—At one time or another, nearly everyone wants to brush up on skills. Edu-Ware offers adults and young learners alike an effective way to review.

Edu-Ware helps solve learning needs each step of the way . . . because some learners require a helping (animated) hand or carefully monitored instruction, while others are prepared to manage their own learning.

For young learners, **ARITHMETIC SKILLS™** uses high resolution displays and minimum text to establish basic math skills—addition, subtraction, multiplication, and division.

EDU-WARE. Because solution means more than "keeping them busy."

The Learning Manager Systems in **FRACTIONS** and **DECIMALS** let specific parameters (i.e. number or subject of test problems, sequence, sound effects) be tailored to the individual.

The **ALGEBRA SERIES**, a sequence of five independent packages, together comprise a first-year algebra course. Its learners have already acquired basic math skills. Selecting to work in one or more "learning styles," each individual is encouraged to achieve an increased level of self-management.

Edu-Ware can make the difference in Language Arts. Often that difference means adaptability to a wide range of learners.

Teachers participating in an MECC evaluation of COMPU-READ reported: "Students liked the programs . . . they really had to concentrate. It was surprising how even the youngest children stayed on task."* **COMPU-READ** is a tool for improving reading speed and recall because it works with the reader (child through adult), matching pace to performance.

COMPU-SPELL teaches spelling by positive reinforcement. With Data Levels 4-8 it will accommodate up to sixty learners, yet gives each individual vocabulary suited to his or her needs. **COMPU-SPELL** with the

Adult/Secretarial level becomes a tool for mastering words common in business, industry, and college.

Edu-Ware helps you to prepare, whether for the college board or the business world.

Word attack skills are tools of analysis which give you an edge on mastering vocabulary, deciphering new or unfamiliar words, and taking tests. **SAT and PSAT** WORD ATTACK SKILLS** are tutorials which give college-bound students that edge.

New tools called Interactive Simulations™ — Demonstration aids learning, especially in subjects like Earth Science and Physics.

RENDEZVOUS accurately simulates, in 3-D animation, the orbital flight of a space shuttle craft. It will demonstrate exact systems of ballistics and orbital mechanics or the disorienting effects of inertial space. Use it to test the limits of learners' (over 13) physics understanding, mathematical judgment, and perceptual skill.

Learning companions for the very young. Children 3-6 are taking their first steps toward "computer literacy." With animation and easy-to-read, high resolution graphics, Edu-Ware's "BEEs" make learning comfortable and

fun without forfeiting carefully managed instruction.

Children work intently with **SPELLING BEE AND READING PRIMER**, discovering basic concepts about words, spelling, and reading. Capturing attention, **COUNTING BEE** introduces young learners to numbers.

Walk into your local computer dealership and

ask for a demonstration of Edu-Ware. You'll see the difference.

Edu-Ware Services, Inc.
P.O. Box 22222
Agoura, CA 91301
213/706-0661

*From a review in the "Instructional Computing Newsletter"; MECC, May 1982.

**Edu-Ware has no affiliation with the College Entrance Examination Board or the Educational Testing Service.

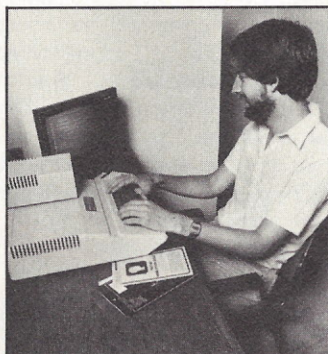
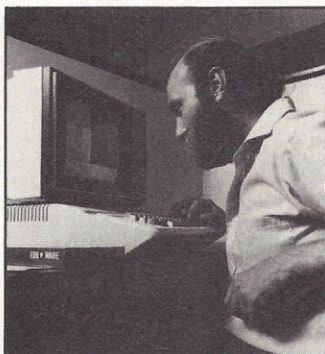
	Apple II/II Plus 48K DOS 3.3	Atari 800 48K Disk	Atari 800 32K Cassette
Arithmetic Skills	\$49.95*	—	—
Edu-Ware Fractions	\$49.00	\$39.95	\$29.95
Edu-Ware Decimals	\$49.00	\$39.95	\$29.95
Algebra 1, Algebra 2, or Algebra 3	\$39.95 each	—	—
Compu-Spell System	\$29.95*	—	—
separate Data Diskettes	\$19.95 each		
Compu-Read 3.0	\$29.95*	\$29.95	\$19.95
PSAT Word Attack Skills; SAT Word Attack Skills	\$49.00 each	—	—
Rendezvous	\$39.95	—	—
Counting Bee	\$29.95*	—	—
Spelling Bee and Reading Primer	\$39.95	—	—

* Also DOS 3.2 compatible.

Edu-Ware is a registered trademark of Edu-Ware Services, Inc.

Apple is a trademark of Apple Computer Inc.

Atari is a trademark of Atari Computers Inc.



It means LEARNING.

CIRCLE 25

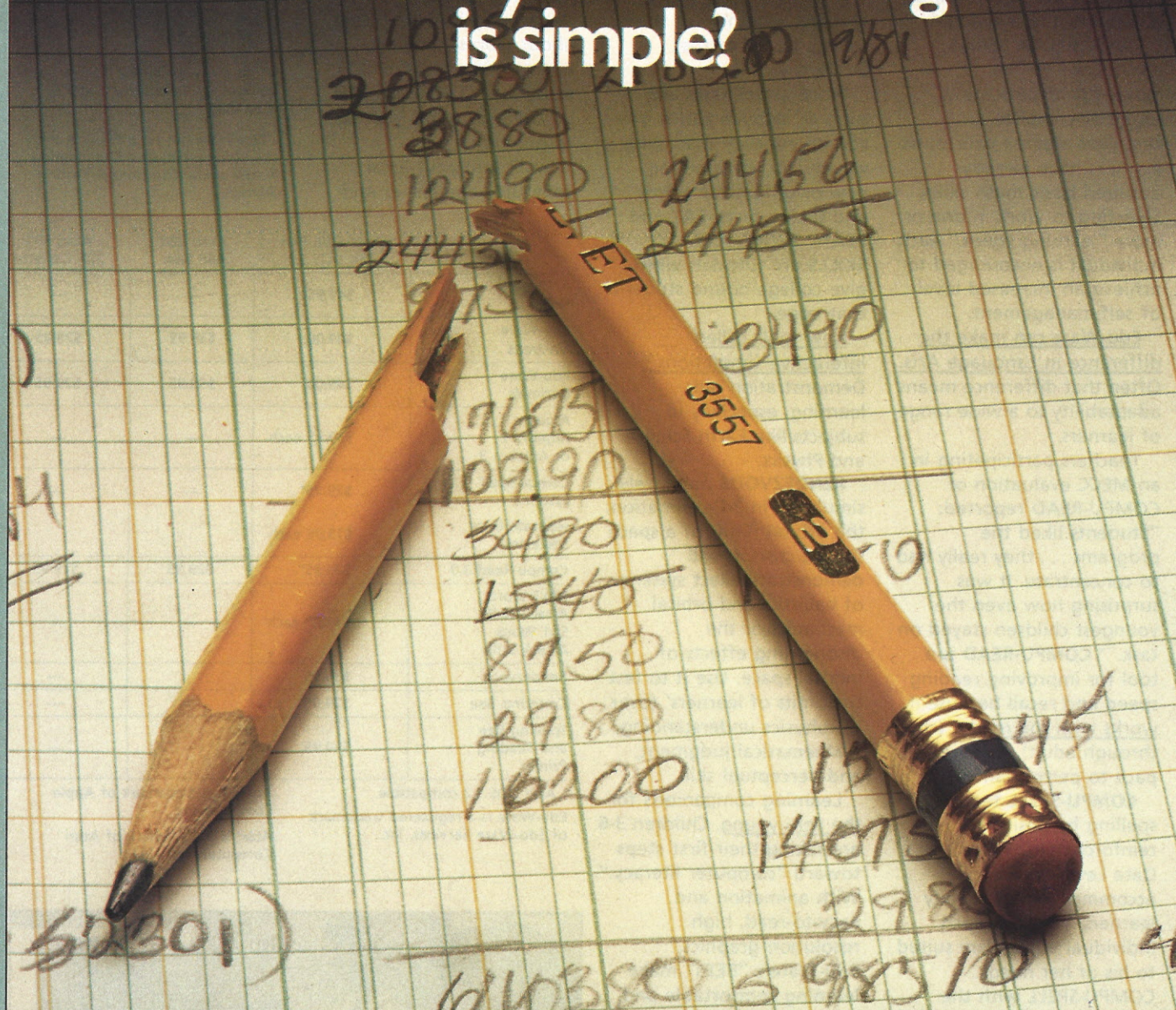
EDUWARE®

The Science of Learning™

October 1982 PERSONAL COMPUTING

119

Who says Accounting is simple?



We do. Over 40,000 BPI accounting systems have been put to use by almost every conceivable type of business. Why? Our software is simple to understand and easy to use, yet powerful enough to meet the needs of almost every business.

Our accounting software systems have been proved again and again by people in all walks of life. And most of them had no previous computer experience.

With some accounting software, if you have questions, getting answers can be difficult or even impossible.

BPI Systems has a service department as close as your telephone. Questions about any of our products will be answered promptly and accurately. Without a service charge to you.

BPI Accounting Software is compatible with most microcomputers available today. In fact, our accounting systems are approved, distributed, and sold by almost all of the top computer manufacturers.

Our General Accounting System may be all the accounting software you will ever need. If you have more specialized needs, you can choose any of our totally integrated systems including Accounts Receivable, Payroll, Inventory Control, Job Cost, Accounts Payable, and Professional Time Accounting. Alone or in combination, they are the easiest to use business accounting systems available today.

BPI Systems offers proven reliability backed by a customer service commitment

second to none in the accounting software industry.

Ask for a demonstration by your computer dealer or write us for more information.

You'll see

that our software is simple to understand and easy to use.

BPI
SYSTEMS

SIMPLY, THE MOST POWERFUL SOFTWARE IN BUSINESS.

3423 GUADALUPE/AUSTIN, TX 78705/512-454-2801

SAT Tutoring Programs: Give Them An Incomplete

Cramming for the Scholastic Aptitude Test that weighs heavily in college entry used to be an arduous memory drill. Personal-computer tutorial programs are making the preparation more enjoyable, but it's too early to tell what they do for scores

by Tom Cullem

Tutorial programs currently available for personal computers can: (choose one)

a) Raise a student's score on the Scholastic Aptitude Test (SAT) 50 to 150 points and improve scores on other standardized achievement tests.

b) Not do anything more for the SAT-taker than programmed learning with paper, pencil, teacher and workbook can. That could mean an increase of only 10 to 20 points.

c) Take advantage of artificial intelligence techniques that a human tutor can't duplicate—at least not at the same cost per student.

d) All of the above.

e) None of the above.

For the moment, the correct answer seems to be a combination of (d) and (e). That's because reliable tests of personal-computer courseware for SATs and similar exams just haven't been performed. So it is pretty difficult to know the value of computerized SAT tutoring. There is some evidence that commercial programs can help boost standardized test scores. But, as with much research into computer-aided instruction (CAI), scientists still aren't sure

why this is so. Some observers even argue that good old-fashioned drill-and-test teaching may help a student survive achievement tests equally well.

Considering how long computers have been in the classroom (about two decades), one would have thought that some shrewd grantsman in academia would have wangled a fat contract for correlation of CAI



Many students find prepping for SATs and similar exams easier when the computer asks the questions.

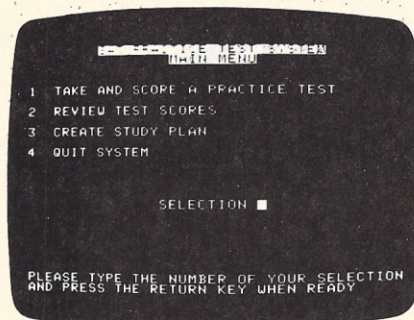
and SAT. After all, the SAT and similar exams like the Preliminary SAT (PSAT), the National Merit Scholarship Qualifying Test (NMQT) and American College Test (ACT) play a big role in determining collegiate fortunes. "Not only does performance on these tests play a key role in gaining admission to many colleges and universities, but it is often a critical factor in the awarding of several types of financial assistance, particularly 'no need' grants," says Borg-Warner in promoting its Microsystem 80 courseware for college entrance exams.

Making the grade

Academic officials decry the attention paid to entrance exam scores, and say that high school grades and letters of recommendation are often more important in admissions decisions. But they don't seem to have convinced college-bound students and their parents. "Just having the name SAT in a courseware title is a draw," says Wendy Peterson, marketing director for Edu-Ware of Agoura, Calif. "Kids and parents are very sensitive about scores." Peterson also thinks that such concern has encouraged the growth of SAT tutoring services like Stanley H. Kaplan Educational Center, N.Y., and that it could also help Edu-Ware

Tom Cullem, a Long Island-based writer, keeps his fingers on the pulse of the computer industry.

"Just having the name SAT in a courseware title is a draw. Kids and parents are sensitive about scores."



Computer SAT, from Harcourt Brace Jovanovich, starts with the main menu . . .

sell its new SAT "Word Attack" series, introduced in June.

Software vendors have good reason to be eyeing the SATs. More than one million students take the test each year, making it about the biggest standardized test in the U.S. More students take standardized reading tests, but these vary from state to state and aren't so amenable to commercial exploitation.

Book publishers have already cashed in on SAT-fever, with the most famous handbook, Barron's *How to Prepare for College Entrance Exams—SAT*, selling over two million copies since 1954. But software sales look to be an even bigger money-maker. Whereas Barron's sold perhaps \$1.6 million worth of its books last year, one of the leaders in SAT software sold \$1 million. The company is Krell software of Stony Brook, N.Y., which has been in the SAT preparation game about 26 years less than Barron's.

So the market for SAT programs is there, and the vendors can't wait to satisfy it. But the question remains: Will SAT programs do the job?

What kinds of results?

At the moment, there isn't much objective evidence to go on; SAT software hasn't been around long enough for quantitative evaluation. Most such work is still in the planning stages. Harcourt Brace Jovanovich (HBJ) plans to test the new

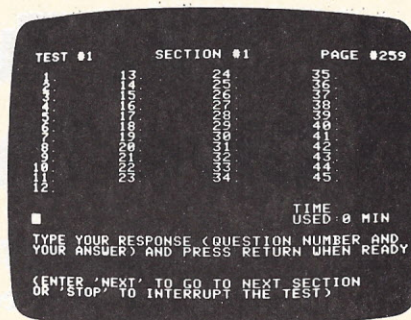
computerized version of its book, *How to Prepare for the SATs* at three schools later this year, while Edu-Ware hopes to run experiments with its courseware in up to 107 "beta-schools."

Some researchers have already reported gains with SAT courseware. Stan Silverman, coordinator of computer programs at Hempstead High School in New York, is one of them. In a rough test that is, nonetheless, state-of-the-art as far as personal-computer SAT research goes, Silverman made various college entrance exams available to 30 seniors. Half the group had access to courseware from a diversified group of vendors, and the other half software from Krell.

The students, who had all previously taken the SAT without benefit of CAI, logged in at terminals at their own convenience. They worked without a teacher, but with a teacher's aid. After an average of about eight hours of computer study, the two groups retook the SATs, as did another group of 60 seniors who did not participate in CAI. The results: The group that used various software posted a 22-point improvement vs. the non-CAI group, and Krell users scored an average of 77 points higher.

Is that anything to cheer about? Maybe. SAT scores range from 200 to 800 on each of two sections: one for verbal aptitude, the other for math. So combined scores range from 400 to 1600. At Hempstead, where the average combined score on the first test was about 900, one set of software may have boosted normal performance by about 3 percent; another set may have increased it 9 percent.

"Seventy points more on the SAT could be important for some of our kids," Silverman says. But he warns that his results should be treated gingerly. He is uneasy about his small sample, and advises teachers at other schools that they might not



. . . which directs the user to several options, among them the test answer sheet.

have the "hardware intensity" needed to duplicate his success. "We had a 1-1 ratio of students and PET terminals," he points out. In many other schools, kids are lucky if their share of terminal time adds up to 30 minutes a day.

The Educational Testing Service (ETS) considers a 10 to 20 point score improvement normal, according to William H. Angoff, executive director for ETS' technical division, so the lower range of Silverman's results doesn't seem significant. However, the reason for the increase is unknown. But the upper end approaches the magic 10-percent or 100-point figure that parents and students can relate to when they weight the tradeoff between software and cold cash.

Krell chairman Ed Friedland thinks 100 points is far from the top when it comes to SAT score improvement. The firm has come out with a more advanced version of the courseware Silverman used, and is reporting even better results. "People are telling us that their mean score improvement is more like 150 points," Friedland states. He is so confident of Krell's "College Board Examination Series" that he is organizing a nationwide tutorial franchise, with a "money-back guarantee" that CAI can raise SAT scores. His goal is to have six or seven CAI centers in operation by the end of December.

Get Omni quality for as little as \$1.99...

even if all you want is a 10 pack.

Call toll-free for great savings on Omni's complete line of 5¼" premium disks. Each is certified error-free at a minimum of twice the error threshold of your system. Each is rated for more than 12 million passes without disk-related errors or significant wear. And each is precision fabricated to exceed all ANSI specifications with such standard features as reinforced hub rings and Tyvec sleeves. Get same day shipment and an unconditional, no hassle money-back guarantee.

ARCHIVE

152 Boston Turnpike
Shrewsbury, MA 01545
(800) 343-0314; In Mass:
(617) 756-2960



**Call toll free
(800) 343-0314
In Mass: (617) 756-2960**

**Call for prices
on 8" disks**

Call if you're not sure which disk is compatible with your system. Call for prices on 96 tpi and special formats. We offer an unconditional money-back warranty. We're here to help.

Be sure to indicate system name and model # at right.

# of 10 Packs	5¼" Disks	Price Per 10 Pack	Total Price
_____	Single side/single density	\$19.90	\$ _____
_____	Single side/double density	\$23.90	\$ _____
_____	Double side/double density	\$39.90	\$ _____
_____	Flip/Floppy reversible Double side/double density	\$39.90	\$ _____
_____	Protective plastic library case (in lieu of soft storage box)	\$ 2.99	\$ _____
	Shipping and handling		\$ 2.00 _____
	Add \$.40 per additional 10 pack		\$ _____
	5% sales tax (Mass. only)		\$ _____
	CIRCLE 45	Total	\$ _____

☐ Check
☐ COD

☐ Master Card
☐ VISA

Card # _____ Exp. _____

System and model # _____

Name _____

Address _____

Tel. _____

EDUCATION

"The market for SAT programs is there. Vendors can't wait to satisfy it, but will the programs do the job?"

YOUR SCORES ON PRACTICE TEST # 1				
	NUMBER RIGHT	NUMBER WRONG	NUMBER OMITTED	RAW SCORE
VERBAL	0	0	85	0
MATH	0	0	60	0
TSUE	0	0	50	0

VERBAL	200			
MATH	220			
TSUE	20			
PRESS M TO RETURN TO MAIN MENU ■				

Once the user takes the test (in the manual provided), the program gives the score. . .

Judy Priven, who directs a computer-aided tutorial clinic in Maryland called "Reading Power," has also had good results with SAT software. Using a combination of programming and conventional tutoring, Priven finds she can increase combined scores about 100 points. "Math is usually a little harder to bring up than English," she notes. "Probably the main problem for kids is that the SAT can cover a wide vocabulary."

The vocabulary vacuum

To help students survive in the vocabulary vacuum, Priven developed a "word attack" program that teaches about linguistic roots, prefixes and suffixes. The theory is that a student can work out the approximate meaning of a strange word by breaking it down into its parts. This talent can pay off in multiple-choice questions about antonyms and synonyms.

Edu-Ware Services has been selling a version of Priven's software since June. "SAT and PSAT Word Attack Skills" are each twin diskettes for use on a 48k Apple II. For the suggested retail price of \$49, the student receives 12-lesson modules and 14 tests, two of them comprehensive. Eventually, Edu-Ware will offer a four-part series for both the SAT and PSAT, with the antonyms and synonyms each to be joined by twin diskettes for analogies, sentence completion and reading comprehension.

Priven used "Word Attack" in a recent tutorial class, but outside of general reports that students found it valuable, has no way of knowing how useful it was. "My own kids probably used the program more than anyone else," she says. "Every Saturday morning they were at it for an hour or so."

Likewise, Paul Peterson, brother of Edu-Ware marketing director Wendy Peterson, was another big user of the initial "Word Attack" series. "We have the results back, and he did well," Paul's sister says, "but since he didn't take the test before, I don't know how much credit to give to the software."

Enthusiasm is lacking

While programmer testimonials support the value of SAT programs, some observers haven't seen the enthusiasm extend to the general run of customers. "I haven't heard people say they love any of our test-preparation programs," reports Elliott Greene, whose New York-based Computerland store has consistently been ranked in the chain's top 5 percent in sales. "But we haven't heard any big negatives, so I guess the programs do some good."

Greene thinks high prices are keeping many personal computerists away from educational software in general, and that consumers are not yet convinced courseware is superior to books. "You don't need programs that give you the same multiple-choice questions and answers. You don't need an electronic scratchpad." Instead, Greene would like to see "more heuristics that would help a student recognize where his shortcomings are," and more programs that automatically replace a wrongly-answered question with another one of equal difficulty. That way, the student receives reinforcement for corrections. Finally, he is waiting for "some of the imagination that goes into arcade games to go into games that teach."

CATEGORY	# RIGHT	OMIT/WRONG	STUDY PRIORITY
I. ANTONYMS	0	25	HI
II. ANALOGIES			
A. MEANINGFUL SENTENCES	0	10	HI
B. DETERMINING CATEGORIES	0	10	HI
THIS IS THE FIRST OF TWO SCREENS (FORWARD), OR (STUDY PLAN MENU)			

. . . and the program then develops a study plan based on the user's test performance.

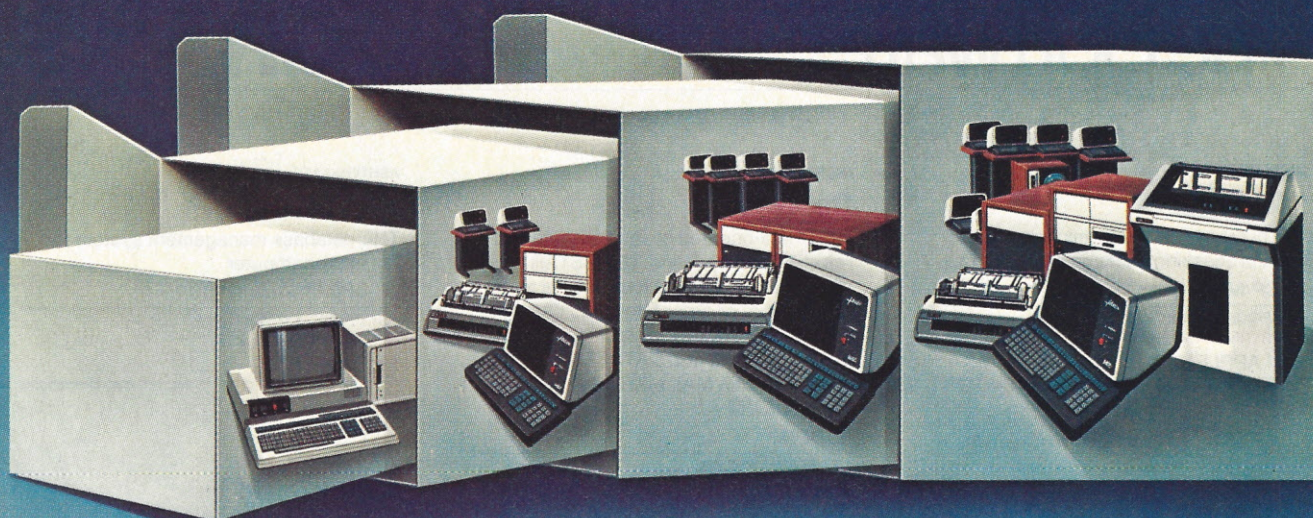
Various program providers hope to give people like Elliott Greene exactly what they want. In addition to cottage-style specialists like Krell and Edu-Ware, many publishers are eager to get into college entrance courseware and educational software in general.

Happy to oblige

Borg Warner's "College Entrance Examination Preparation" (CEEP) is among the major entrants in personal-computer courseware. Part of the MicroSystem 80 education library, CEEP has been out about a year. It has 56 instructional modules on 12 disks, test questions similar to the SAT, good estimates of likely SAT scores, and an overall game plan. In its lesson mode, the Borg Warner system provides hints and explanations that help clarify questions and also analyzes right and wrong answers.

On price, if not performance, CEEP is the cadillac of SAT software. It costs nearly \$1500: \$575 for five disks on antonyms and synonyms, and \$875 for seven disks that cover advanced verbal skills, plus mathematics. One reason for the fat sticker-price is a sophisticated teacher management system that supposedly lets teachers track up to 1000 CAI learners simultaneously.

According to statements by Borg Warner executives, the company's
(continued on page 128)



YOUR NEC COMPUTER GROWS WITH YOU.

NEC's Astra™—the expandable business computer.

Be certain that the business computer you buy to solve your problems today won't add to your problems tomorrow.

With the NEC Astra Series, as your business grows, you can expand from a single user desktop version all the way up to a powerful 16-station system. Yet the software which solves your business problems, from financial modeling to general accounting to word processing, remains the same.

Regardless of your company's size, we have a reliable, innovative business computer system to satisfy your present as well as future needs. Solutions that don't burst at the seams as your company grows. That's the NEC commitment, a commitment which has helped make NEC one of the world's largest computer companies.

Start your growth process. See a demo now.

To talk about where you're going, and how NEC can help you get there, return the coupon to NEC Information Systems Inc., 5 Militia Drive, Lexington, MA 02173.

Astra is a trademark of Nippon Electric Co., Ltd.



- ☐ I want to see a demo of the NEC Astra.
- ☐ I want more information on the NEC Astra.

NEC Information Systems, Inc.
5 Militia Drive, Lexington, MA 02173

NEC
NEC Information Systems, Inc.

Name _____

Title _____

Company _____

Address _____

City, State, Zip _____

Telephone _____

PLC 1082

CIRCLE 54

The Benchmark in World Class Computers

The Software:

PROGRAMS

MICROPRO

WordStar®

The number one selling microcomputer word processing package in the world.

8" CP/M®

LIST PRICE: 495.00

MH PRICE: 289.00

5 1/4" APPLE®

LIST PRICE: 375.00

MH PRICE: 234.00

MICROPRO

MailMerge™

A multi-purpose text-data merging program. One of its most popular uses is producing personalized form letters. Requires WORDSTAR®.

8" CP/M®

LIST PRICE: 150.00

MH PRICE: 99.00

5 1/4" APPLE®

LIST PRICE: 125.00

MH PRICE: 83.00

MAILMERGE, DATASTAR, SPELLSTAR, CALCSTAR, and SUPERSORT are trademarks of MicroPro International, San Rafael, California USA.

QUICKCODE, QUICKSCREEN, and dUTIL are trademarks of Fox & Geller Associates.

VISITREND/VISIPLOT, VISIFILE, VISISCHEDULE, VISIDEX, VISITERM, and DESKTOP PLAN are trademarks of VisiCorp.

dBASE II is a trademark of Ashton-Tate.

MATHSTAR is a trademark of Force Two, LTD.

SUPERCALC is a trademark of Sorcim.

SPELLGUARD is a trademark of Innovative Software Applications.

T.I.M. is a trademark of Innovative Software, Inc.

CROSSTALK is a trademark of MicroStuf.

EASY WRITER and EASY SPELLER are trademarks of Information Unlimited Software.

PERFECT WRITER and PERFECT SPELLER are trademarks of Perfect Software, Inc.

WORDSTAR is a registered trademark of MicroPro International, San Rafael, California USA.

VISICALC is a registered trademark of VisiCorp.

CP/M is a registered trademark of Digital Research.

APPLE is a registered trademark of Apple Computers.

IBM is a registered trademark of International Business Machines.

MICROPRO

DataStar™

The office-oriented system for data entry, retrieval, and updating. DATASTAR allows you to create a form, be it a price list, catalog, or order form. You can edit, update, or save this information in a file or simply print it out. DATASTAR interfaces with MAILMERGE and SUPERSORT.

8" CP/M

LIST PRICE: 350.00

MH PRICE: 235.00

5 1/4" APPLE®

LIST PRICE: 295.00

MH PRICE: 199.00

MICROPRO

CalcStar™

Financial planning and business decision-making made simpler, faster, and more accurate. CALCSTAR calculates solutions to complex numerical problems in business and finance. CALCSTAR turns your microcomputer's video screen into a 'window' on a gigantic electronic ledger sheet with up to 600 entries arranged the way you want.

8" CP/M®

LIST PRICE: 295.00

MH PRICE: 199.00

5 1/4" APPLE®

LIST PRICE: 195.00

MH PRICE: 149.00

FORCE TWO, LTD.

MathStar™

MATHSTAR is a combination adding machine/calculator program, designed specifically for use with MicroPro's WORDSTAR®. Provides basic math functions, formatted results, and accounting notation.

8" CP/M®

LIST PRICE: 125.00

MH PRICE: 99.00

5 1/4" APPLE®

Same as 8" CP/M*

ASHTON-TATE

dBASE II™

THE database management system for the microcomputer.

8" CP/M®

LIST PRICE: 700.00

MH PRICE: 489.00

5 1/4" APPLE®

Same as 8" CP/M*

FOX & GELLER

QuickCode™

QUICKCODE allows dBASE II users to create the following programs, in a matter of seconds, without programming.

- ☐ Data entry programs
- ☐ Data retrieval programs
- ☐ Date edit/validation programs
- ☐ Menus
- ☐ dBASE II files

PLUS: 4 New Data Types:

- ☐ Date
- ☐ Dollars
- ☐ Telephone
- ☐ Social Security number

QUICKCODE includes a powerful new version of QUICKSCREEN, the dBASE II screen builder.

8" CP/M®

LIST PRICE: 295.00

MH PRICE: 249.00

5 1/4" APPLE®

Same as 8" CP/M*

FOX & GELLER

dUTIL™

dUTIL is the BASE II utility program which saves valuable computer time and work by:

- ☐ Increasing command file running time
- ☐ Creating standard text files to use within your word processor
- ☐ Automatically debugging dBASE II command files

dUTIL does not require QUICKCODE or QUICKSCREEN.

8" CP/M®

LIST PRICE: 99.00

MH PRICE: 75.00

5 1/4" APPLE®

Same as 8" CP/M*

Call Toll-Free: 1-800-523-9511

In Pennsylvania: 1-215-868-8219

The Software:

PACKAGES

	CP/M®		APPLE®	
	COMBINED LIST PRICE:	MICROHOUSE PRICE:	COMBINED LIST PRICE:	MICROHOUSE PRICE:
MH-1 WORDSTAR®/MAILMERGE	645.00	319.00	500.00	259.00
MH-2 WORDSTAR®/MAILMERGE/DATASTAR	995.00	519.00	795.00	399.00
MH-3 WORDSTAR®/CALCSTAR	790.00	419.00	570.00	299.00
MH-4 WORDSTAR®/MATHSTAR	620.00	369.00	500.00	319.00
MH-5 dBASE II/WORDSTAR®/MAILMERGE	1345.00	819.00	1200.00	719.00
MH-6 dBASE II/QUICKCODE/ WORDSTAR®/MAILMERGE	1640.00	999.00	1495.00	899.00
MH-7 dBASE II/QUICKCODE/dUTIL	1070.00	749.00	1070.00	749.00

NEW: The IBM®-PC Software Menu.

MICROPRO		IUS	
WordStar®	289.00	Easy Writer II	299.00
MailMerge	99.00	Easy Speller	149.00
SpellStar	149.00	PERFECT	
DataStar	199.00	Perfect Writer	289.00
SuperSort	170.00	Perfect Speller	149.00
CalcStar	199.00	SORCIM	
VISICORP		SuperCalc	209.00
VisiCalc®	190.00	ISA	
VisiTrend/VisiPlot	228.00	SpellGuard	249.00
VisiFile	169.00	ISI	
VisiPlot	179.00	T.I.M.	399.00
VisiSchedule	249.00	MICROSTUF	
VisiDex	190.00	CrossTalk	119.00
VisiTerm	80.00	ASHTON-TATE	
Desktop Plan	190.00	dBASE II	CALL

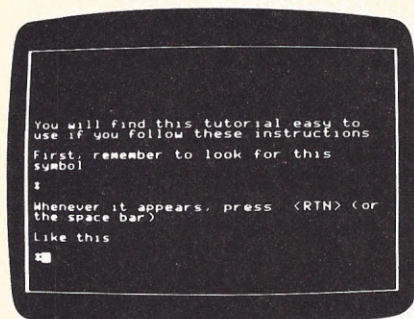
Microhouse 1444 Linden Street / P.O. Box 498 Bethlehem, Pennsylvania 18016

Prices and specifications subject to change without notice.

All items subject to availability.

MICROHOUSE™

The Microcomputer People.™



Edu-Ware's PSAT Word Attack Skills offers a tutorial on the program's use. . .

SAT TUTORING PROGRAMS

(continued from page 124)

management algorithms can provide a detailed analysis of student performance in all categories, prescribe future study based on student strengths and weaknesses, and determine if spending more time drilling a particular skill is likely to improve the student's score.

The management system Borg Warner sells makes sense in its major market: schools. Educators also express appreciation for the rental deal on CEEP: \$180 for the first year a subscriber holds the package (\$1450 face value) and \$90 a year renewal rate thereafter. But the rental rate isn't available to consumers.

Sophisticated software

Fortunately, many personal-computer users won't need a big management system. As Stan Goldberg, president of Micro Lab (Highland Park, Ill.), points out, some of the sophisticated programs now available can force students to study what they need to study most; but some of this is common sense. "You don't need someone to tell you to study antonyms when you only get three out of 25 right on the test," Goldberg argues. In any case, the personal-computer user can find promising software ranging anywhere from \$15 to \$300.

The programs offered by Krell are at the high-end of the price scale. But

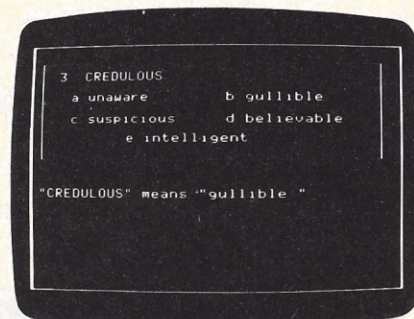
Krell's Friedland says that the sophistication of his company's software more than makes up for its additional price. Friedland claims that his latest software includes "some very clever artificial intelligence applications." He also says that the Krell program diagnoses student problems, automatically channels studies into areas that need more work, and keeps cumulative track of time and score during simulated tests.

Krell's cumulative score feature is a good example of what SAT gamesmanship is all about. In the actual exam, right answers earn a point, wrong ones lose a point and passes count for nothing. The system discourages outright guessing, but the student who can narrow his choice to two alternatives can make some points on the probability that he is right more often than wrong.

"It's funny," says Hempstead's Silberman. "No matter how many times we told the kids not to guess before they took the first SAT, they would still guess." But by seeing during the simulated SAT how each stab in the dark cut down their scores, the students got the message. "The Krell software made it very clear to them how costly the guessing-game can be," he recalls.

Krell's Friedland points to other SAT games. In the math section, a favorite ETS trick is to change units of measure between question and answer, and link up a likely numerical figure with the wrong descriptor. The unwary student who diligently does his calculations but fails to watch out for mines doesn't ace the SAT, Friedland warns.

A Ph.D in Political Science, Friedland takes a libertarian delight in writing software that fundamentally tries to out-game the SAT. "The ETS people don't generate good wrong answers randomly," he points out. "They use likely mistakes" that test-takers can learn by computer simulation.



... then begins teaching some word attack methods using Latin roots. . .

Friedland's latest software is supposed to force program users to follow lesson plans based on computer diagnosis of good and bad points. He also uses random-number programs to ensure that students can't max-the-SAT by merely memorizing test answers. "The structure of the problems may still be familiar to many of them, but the numbers change, which is something that a book can't do," he claims. The whole process "forces them to read very carefully. And as we know, precision reading of problems can make a big difference in how we solve them."

Books vs. computers

If Friedland thinks there are some things a book can't do as well as a machine, traditional educational publishers think just the opposite. Harcourt Brace Jovanovich is a case in point. Officials there think what is needed to propel the SAT software market is a nice fat book like *How to Prepare for the SATs*.

HBJ has put out a 400-page paperback "How to Prepare" book for about a year. Last month it combined the book with a program consisting of a loose-leaf binder, a 32-page user manual and two floppies. The whole deal has a suggested retail price of \$70, or more than 10 times what the book cost. But the price is well worth it, because purchasers get a lot more than they did with the book, HBJ spokesmen say.

“Consumers are not convinced that courseware is superior to books, and its high price is discouraging them from finding out.”

“The disk material doesn’t duplicate the book at all. It expands the instruction section and includes a whole new series of 540 new drill items,” says Kenzi Sugihara, product manager for the “How to Prepare” courseware. He thinks the hard-copy handout is “an enormous advantage,” especially when going up against Krell.

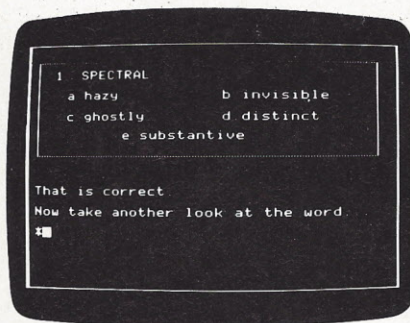
Even for a computer whiz, a hand-book documenting the SAT program is helpful. For a teacher, it is downright indispensable. But Krell’s first software products amounted to “only a few flimsy pages,” Silverman recounts. He was more impressed with the documentation on an analogies program from Program Design Inc. where Krell is supposed to be beefing up its hard-copy effort, but big publishers like HBJ clearly think they have an opening.

At the moment, HBJ is the only big publisher with CAI for SATs. “We will address (the SAT market) before too long,” says Chuck Carlson, systems publisher/school division at Random House. But right now all Random House has for SATs is *Scoring High*, a book that helps students score well on achievement tests.

At Barron’s, home of the leading guidebook on SATs, “electronic courseware is being discussed. But nothing is definitely planned,” a company spokesman reports. And R&D instructional design manager Ellen Smith of *Reader’s Digest* says, “it is too early” to talk about SAT programs. “We’ve only had personal-computer programs out for about a year now, and only for grades K-8.”

On the publishing agenda

Bowdie Marx, a vice president at St. Louis-based Milliken, is waiting for “our big New York and Chicago competitors” to jump into electronic publishing. But he doesn’t think SAT programs will be first on the agenda. “The demand for material is really in the basic skills—math, reading and language arts,” he says. “You don’t



... and finally rewards correct work with positive reinforcement.

find a lot of instructional software after eighth grade because high schools use computers almost exclusively for computer literacy.”

Not surprisingly, then, an educational group reviewed personal-computer courseware last year and found most of it directed toward grades K-8, with “no large commercial package available for high schools” and an emphasis on “skill development and fast recall vs. higher-level thinking.”

What’s the crucial ingredient?

Boosters of SAT courseware depend on a general enthusiasm for computer-aided instruction (CAI) to give credence to their programs. But in fact the record is a bit garbled.

Spearheaded by Patrick Suppes at Stanford University, researchers identified the advantages of the computer in teaching subjects that demand drill and memorization—advantages like repetition, infinite patience, and the ability to tailor program content and pace. Suppes continues to be a champion of CAI, but like many other seasoned researchers, he isn’t sure that the computer is the crucial ingredient in many of the alleged demonstrations of CAI clout.

“There have been a great many studies showing that supplemental work on basic skills improves them,” Suppes notes. “But there’s been research of that kind since the 1920s.” It isn’t necessarily “some magical


property of the computer” that raises the student’s score; sometimes, it is merely the process of programmed instruction. “Every time you produce a well-thought out program for a student, there will probably be some improvement in his score,” Suppes contends.

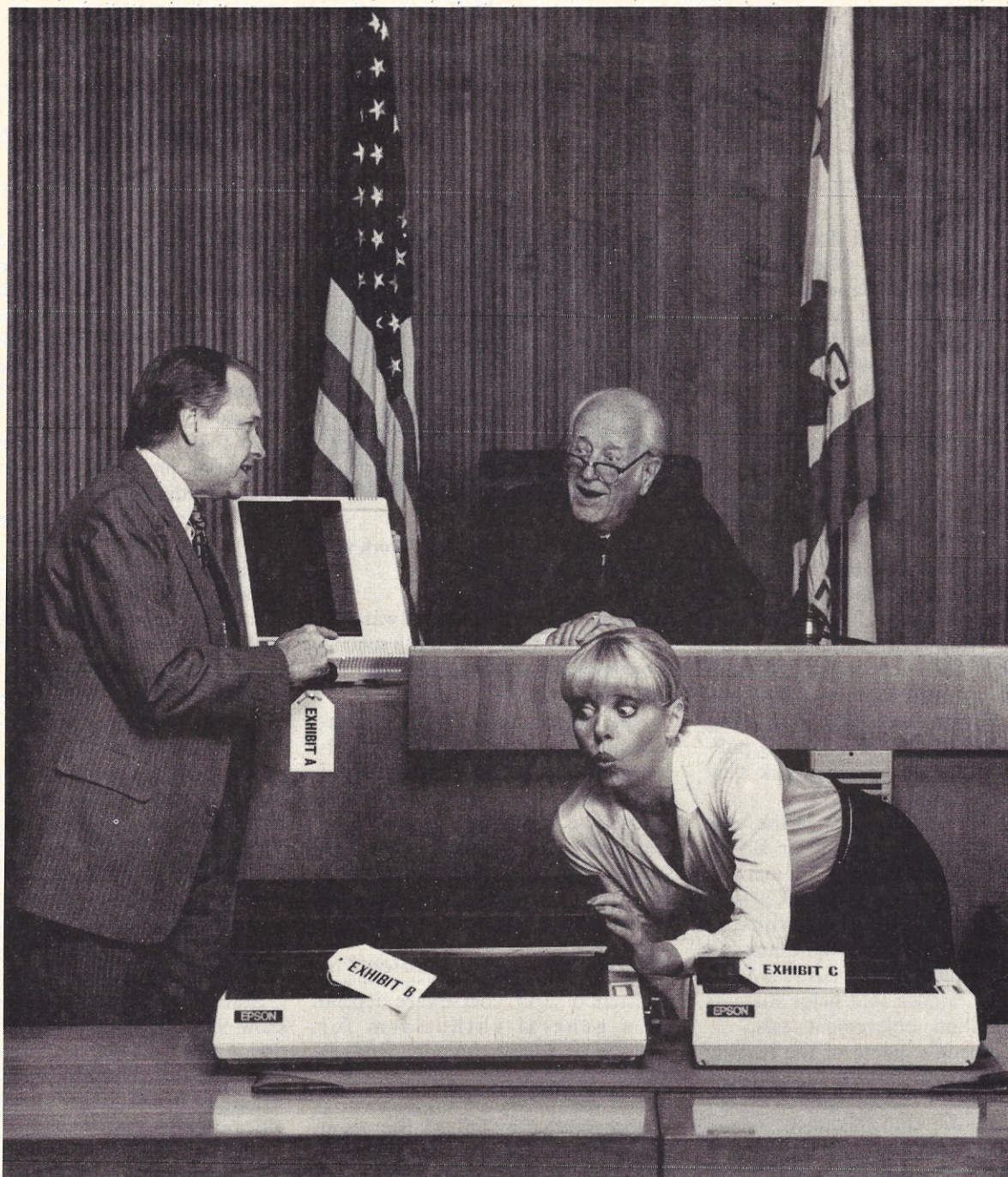
Be that as it may, computerized instruction programs do raise scores on standardized tests.

One recent test illustrates both the promise of CAI, and the perils involved in estimating its impact. Looking at 80 rural students in Lolo, Montana, a University of Montana doctoral student, Sandra Hollingsworth, studied improvement in vocabulary scores for three groups. One group was taught conventionally, with teacher and test; the second group received 10 minutes drill per day on a 48k Apple; the third received precision teaching, which includes continuous review of material and repetitive charting of student progress. The three groups scored overall gains on oral, silent and spelling tests of 8, 15 and 22 percent, respectively.

Statistically speaking, the numbers show 99 percent confidence for the notion that CAI and precision teaching are superior to normal instruction. But they don’t show a significant difference between the two superior methods. So the believers in old-fashioned rote education still aren’t convinced of the computer’s pre-eminence.

Still, despite the rumblings of its detractors, CAI has proven itself in many locales. One of them is Houston, where high school students drill on Apple II computers in 57 secondary schools. According to Pat Sturdivent, associate superintendent for technology, CAI has helped raise high school scores on a state achievement tests.

So, personal computerists, be ready. The day that personal-computer programs improve SAT scores may have just begun. 



The facts.
And nothing but the facts.

Epson.

Our MX Series printers are the best-selling dot matrix printers in the entire world. This is why.

Fact One: We've got your type.

Epson invented correspondence quality printing. And we still do it better than anybody.

But more importantly, we do *more* of it than anybody. On every Epson MX printer, you get a choice of *sixty-six* different type styles, including italics, a handy subscript and superscript for scientific notation and small print, enough international symbols to print most Western languages, and one-pass underscore. All in a tack-sharp, easy-to-read 9x9 matrix with full descenders.

If print quality is important to you, your next printer is an Epson.

Fact Two: Ultra-high resolution graphics.

There simply is no higher resolution graphics than GRAFTRAX-PLUS. And it comes standard on every MX.

You get bit image graphics free of wander, walk and jitter; graphics with blacker blacks and better definition because you can precisely place a dot at any of 25,920 positions inside a square inch (that's 120 DPI h x 216 DPI v); graphics that make our printers rival plotters.

If graphics is what you want, your next printer is an Epson.

Fact Three: Feature shock.

The Epson MX Series is packed with the features printer fanatics want most. A bidirectional print head with logical seeking of the shortest line. Programmable tab, form length and right margin. Top of forms recognition. Skip over perf. Software printer reset. True

backspace. Self test. The world's only disposable print head. And more. Lots more. On our MX-100 and MX-80 F/T, you even get both friction *and* tractor paper feed.

If you want performance, your next printer is an Epson.

Fact Four: Incredible reliability.

Epson MX Series printers are the most reliable printers ever made. And the reason is precision.

Take a look inside one and you'll understand. Notice the simplicity, the fit, the finish. That's why Epson has an out-of-box reliability rate others can only envy: 98%. And why our mean cycles between failures (MCBF) is over five million lines.

The whole package is neatly wrapped in a rugged plastic injection-molded case designed to look good — and stay looking good.

If you want a printer that works, and keeps on working, your next printer is an Epson.

Fact Five: World's best seller. Period.

Within months after we introduced the Epson MX-80, it was the best selling dot matrix printer in the world. It still is. Not because of anything *we* said, but because tens of thousands of computer enthusiasts went out and did some serious comparison shopping. *They* decided it was the best printer for the money they could buy. And who are we to argue?

If you want the world's best seller, your next printer is an Epson.

Fact Six: Quality doesn't cost more.

Don't take our word for it. Check it out. Look at what they give you. Then look at what we give you. Then look at the price.

There is only one logical choice. Epson. And that's the truth.

"In my judgment,
this is the
best printer
you can buy."



Your next printer.

EPSON
EPSON AMERICA, INC.
COMPUTER PRODUCTS DIVISION

3415 Kashiwa Street
Torrance, California 90505
(213) 539-9140

Programming For The Written Word

This second part of a four-part series follows a programmer through his craft as he creates a simple word processor that helps master the intricacies of language

by Leon Starr

Personal Computing magazine commissioned Leon Starr to write a program incorporating functions professionals and executives need most on their desks—memo writing, filing, appointment scheduling and calculating. The result, a program called Desk Master, is available to Personal Computing subscribers who renew their subscriptions.

these functions are tied together with menus that display options users can select. This month Starr talks about how he designed the word-processing function.

A word processor accepts text input, allows the user to manipulate that text, stores the text on disk for future reference, and prints the information on paper. There are many word processors on the market that provide sophisticated text-manipulation functions. Desk Master, as you may remember from my last article, provides relatively simple functions in all its sub-programs. When I was formulating the word processor, I realized it would have to be less complicated and, consequently, less powerful than most word processors.

But it did mean the word processor would be easy to learn and to use. I designed it for writing out short documents, like memos, but you can modify it to handle longer material.

Personal computers spend a lot of their time processing textual input. Accounting programs, planning programs and even game programs have to accept some form of text, from file names to liens to transactions. I thought that since word processing is so ubiquitous, designing a word-processing program would be easy. After all, lots of other people had done it. And the INPUT statement and a string variable would be all I'd need to grab a line of text from the user. I assumed that it wouldn't take too many lines of code to set up a loop of INPUT statements to make up my word processor.

Further thought led me to see this as a less trivial problem—a lot less trivial. Have you ever tried passing a slow truck on a two-lane highway only to discover bumper-to-bumper traffic extending out to the distant horizon? That's what I felt like when I discovered how incomplete my initial assessment of the problem was.

First, I couldn't just grab lines. Each character would have to be analyzed as it came in. This would keep the user from typing too far past the margin or from accidentally messing up the screen with weird characters

THE STRING ARRAY

DIM L\$ (BS)

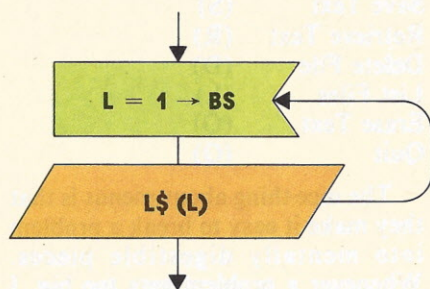
BS = buffer size

Diagram illustrating the print range for L\$ (3) with two lines. The grid shows the text "THIS IS A MEMO" on line 1 and "WITH TWO LINES" on line 2. The print range is indicated by a jagged line starting from the bottom left and moving upwards, showing the sequence of lines to be printed.

PRINT L\$ (3) with two lines

PRINT L\$ (3) with two lines

like CTRLs, arrows, ESCs, etc. In fact, it would be nice to have the program look for a particular key to be



hit, like ESC or BREAK, so that it would know when to stop inputting information.

Once the user has entered his text, he needs to be able to make changes. Each type of change would have to be supported by a different routine,

most likely. (Can you see those cars piling up?)

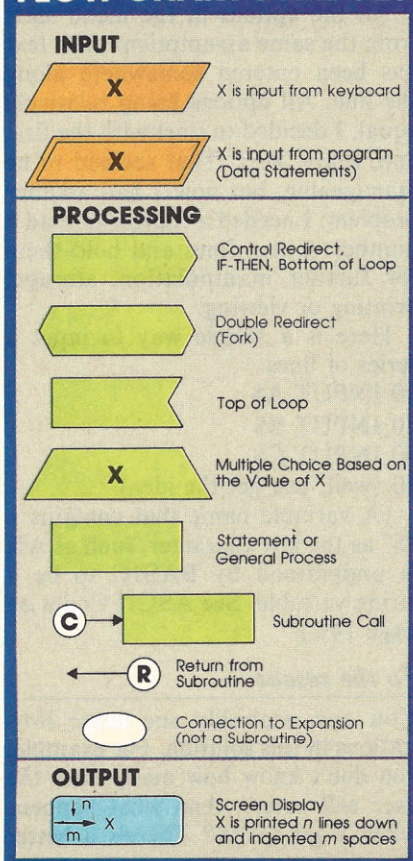
Naturally, I'd have to provide for printing the entered and altered text. But to do that, I had to provide for saving the text on disk. And I'd have to accommodate other disk transactions, like loading and listing available files. There was at least some comfort in knowing that I'd use many of these routines in the index-card file and the appointment calendar. I'd need at least the same disk interactions in both those sections. Records and appointments are both

blocks of text that I could treat in much the same way as the memos and other short documents that the word processor would handle. In fact, I reasoned, the word processor could be common to the entire Desk Master program since it could very well handle the entry of records and appointments.

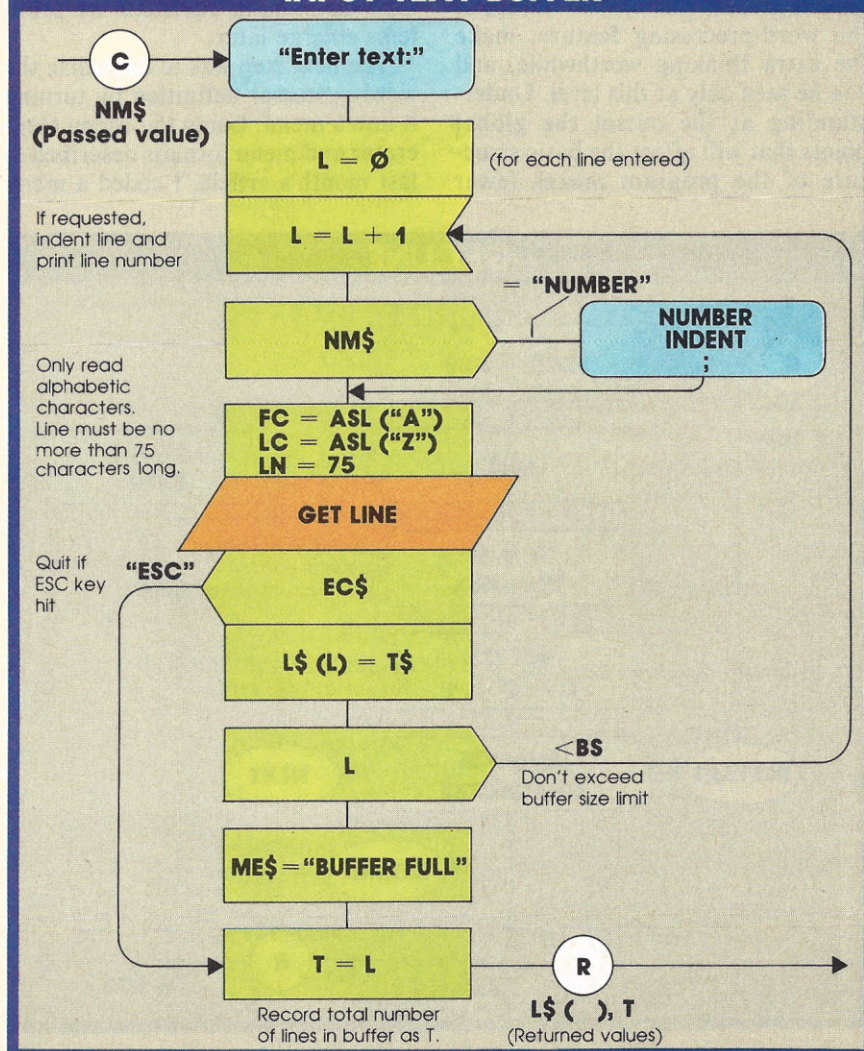
A painful process

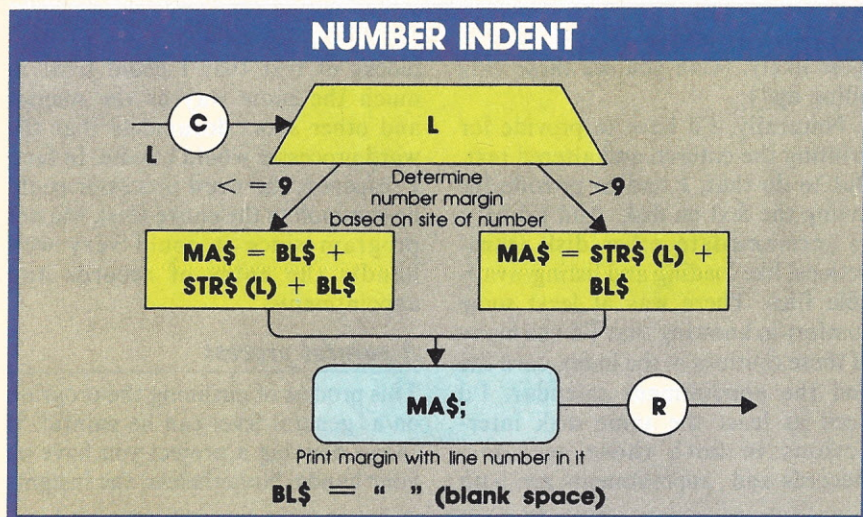
This process of outlining the program on a general level can be painful. It shows how big a project you have on your hands. Nonetheless, the insights

FLOW CHART SYMBOLS



INPUT TEXT BUFFER





gained, such as the central nature of the word-processing feature, make the extra thinking worthwhile, and can be seen only at this level. Understanding at the outset the global points that will affect the basic structure of the program means fewer

time-consuming revisions as problems emerge later.

The next step was to formalize the word-processor definition by turning it into a menu. Using the Menu Generator and menu formats described in last month's article, I coded a menu

that produced output something like this:

```

Enter Text      (E)
Change Text    (C)
Print Text     (P)
Save Text      (S)
Retrieve Text   (R)
Delete File    (D)
List Files     (L)
Erase Text     (O)
Quit           (Q)
    
```

The nice thing about menus is that they make it easy to break a problem into mentally digestible pieces. Whenever a problem gets too big, I just break it into pieces and attack each piece. Later on I try to puzzle them together from firmer ground. Remember the car analogy mentioned earlier? Trying to solve too many problems at once is like passing too many cars at once. It's a great achievement, and it sometimes works, but it's rarely worth the mental anguish.

All the options in the menu start from the same assumption: that text has been entered somewhere along the line. All options being relatively equal, I decided to start with the first one, Enter Text. That seemed to be manageable, but now I had another problem: I needed a routine to read a number of text lines and hold them for further manipulation, storage, printing or viewing.

Here is a simple way to input a series of lines:

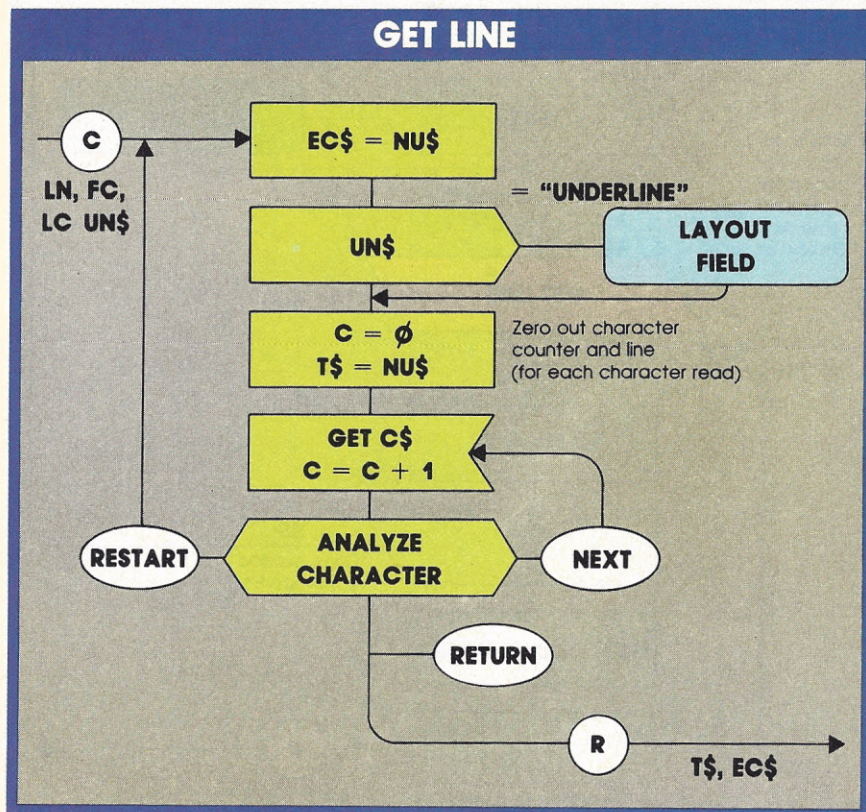
```

10 INPUT A$
20 INPUT B$
30 INPUT C$
40 (well, you get the idea)
    
```

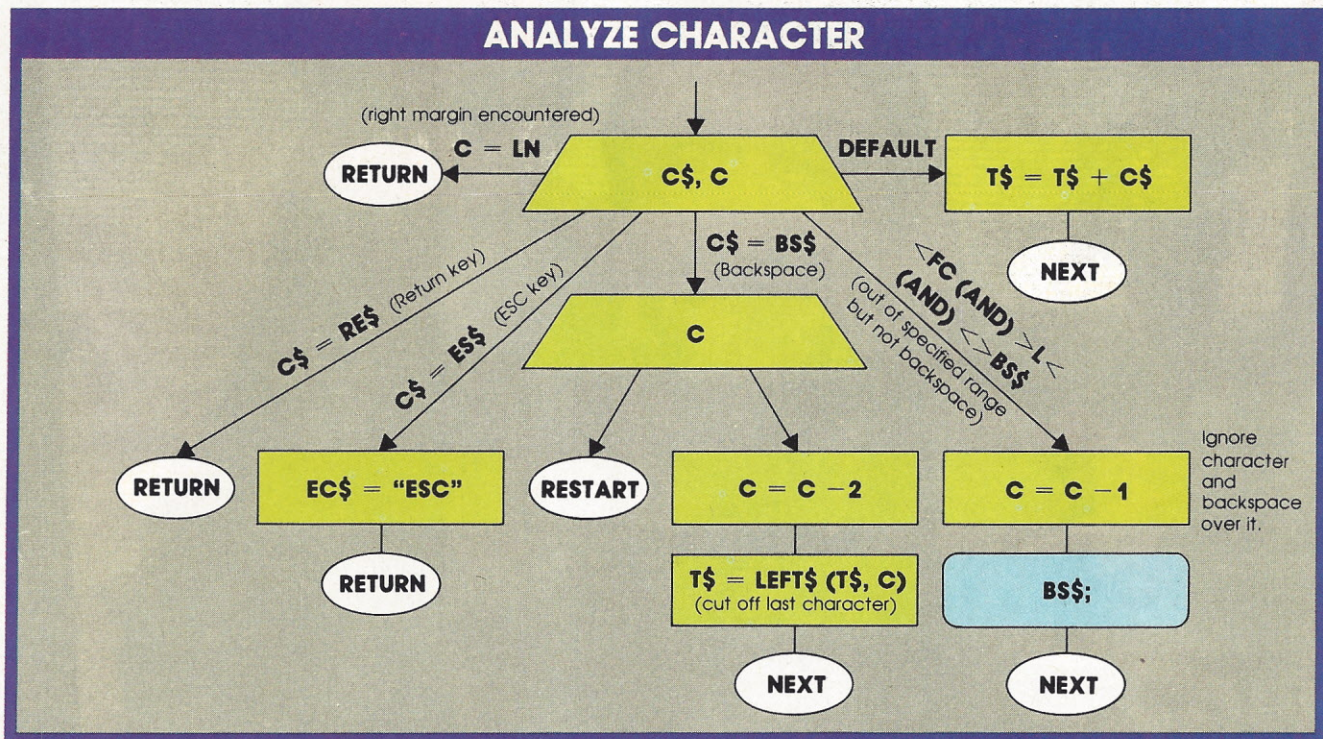
(A variable name that contains a "\$" as the last character, such as A\$, is understood by BASIC to be a string variable. See ASCII Codes on page 141.)

To the rescue

You can probably see some limitations in this solution. For example, you don't know how many lines the user will enter. And what happens when I get to Z\$? There's a better



“Understanding the global points that will affect the structure of the program means fewer time-consuming revisions.”



way to input strings using an array.

The string array is a lot like a sheet of notebook paper that holds many lines of text. Imagine such a sheet with a memo written on it. Let's give the memo a clever name like `M$`, and mentally number all the lines on the paper in the left-hand margin. Now, if I wanted to refer to a particular line—number 15, for instance—I would mention `M$(15)`. Likewise, `M$(1)` would represent the first line of the memo.

Just like this imaginary sheet, an array has a limited size. This is always declared at the beginning of the program in a `DIM` (dimension) statement as follows: `DIM M$(25)`. The array `M$()` can consist of 25 initially blank lines. Unfortunately, not all forms of BASIC let you create string arrays so easily, but most work this way. If yours doesn't, don't worry, the same notion is implemented in some other way.

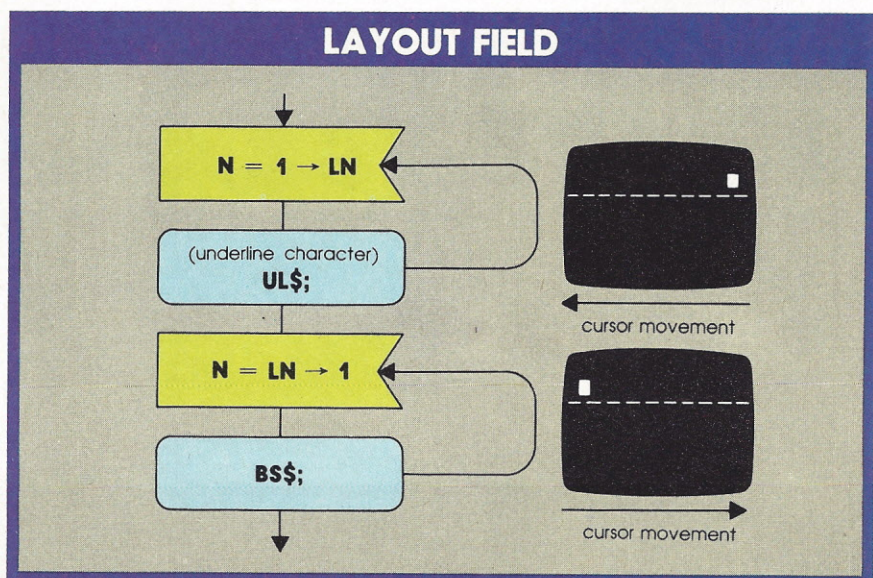
Here's how this relates to inputting and holding text. I declared a string array that will act as a text buffer,

`L$`, as follows: `DIM L$(BS)`, where `BS` is the buffer size in lines. Then I used the following loop to fill it:

```
10 FOR L=1 TO BS
20   INPUT L$(L)
30 NEXT L
```

This loop didn't solve the problem of determining how much text the user wants to enter, but it shortened the program. Still, I knew that wouldn't last, because a more com-

(continued on page 138)



Lay out a field of underlines (`UL$`) as long as the expected length of input (`LN`).



"NOW WE HAVE IT!"

Introducing better company planning, company-wide, with VisiCalc Advanced Version.

More than 300,000 business professionals have discovered how much help our VisiCalc® program can be in planning, budgeting and forecasting. Now we can help businesses even more.

VisiCalc Advanced Version does it all

VisiCalc Advanced Version makes it easy to extend the problem-solving power, speed and accuracy of the "electronic worksheet" throughout an organization.

With this program, you'll be able to leverage the knowledge of your most knowledgeable people. Make more productive use of more of your staff. And do a better, faster, smarter job.



"I create a complex, yet easy-to-use worksheet..."

The best way to do what every company wants to do better

With VisiCalc Advanced Version, the people and departments in your firm will be able to quickly develop their plans, in a uniform format, for easier consolidation into your overall plan.

And everyone involved in your planning process will be able to make their most productive contribution to the effort.

Sophisticated planning made easy for everyone

Using VisiCalc Advanced Version, knowledgeable individuals within your company can create powerful, preformatted worksheets, or "templates," for nearly anything numerical.

For example, the knowl-



"Then, doing our department's budget is as easy as filling in the blanks!"



"The program makes it practically impossible to make mistakes!"



"I ask 'What if?' by changing any number... the new results are instantly calculated."

edge of a corporate financial officer can be applied to create templates for complete and

consistent financial reporting. Then others in your company without extensive financial or computer expertise can easily use these templates to provide the desired information in a uniform manner.

It's so easy. They simply "fill in the blanks" on the worksheet. In seconds, the program performs all the complex calculations built into the worksheet, and displays the answers to problems that could have taken hours to solve by hand.

Everyone can consider "What if...?"

The speed and versatility of VisiCalc Advanced Version make it easy to explore alternatives. Both template build-



"With just a few keystrokes I consolidate the worksheets..."

protect all these parts of a worksheet. It can shield confidential data a user need not see and also guide a user step-by-step through a worksheet.

You can also insure that a user can't enter a label when a number is called for—and vice versa.

And if users ever need additional guidance in completing their worksheets, VisiCalc Advanced Version provides comprehensive on-screen help, at a touch of the "?" key.

Multi-sheet consolidation and finished reports, too

VisiCalc Advanced Version makes it easier to consolidate worksheet totals from various



"And produce presentation-quality reports for my boss."

ers and worksheet users can change any number in a problem and instantly see the new results. Everyone will be able to analyze the impact of decisions before they make them.

Mistakes locked out, help built in

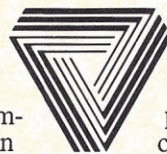
With VisiCalc Advanced Version there's no worry about someone accidentally altering formulas, titles or any other important information. The program can

groups, departments or divisions into concise, presentation-quality reports.

See for yourself

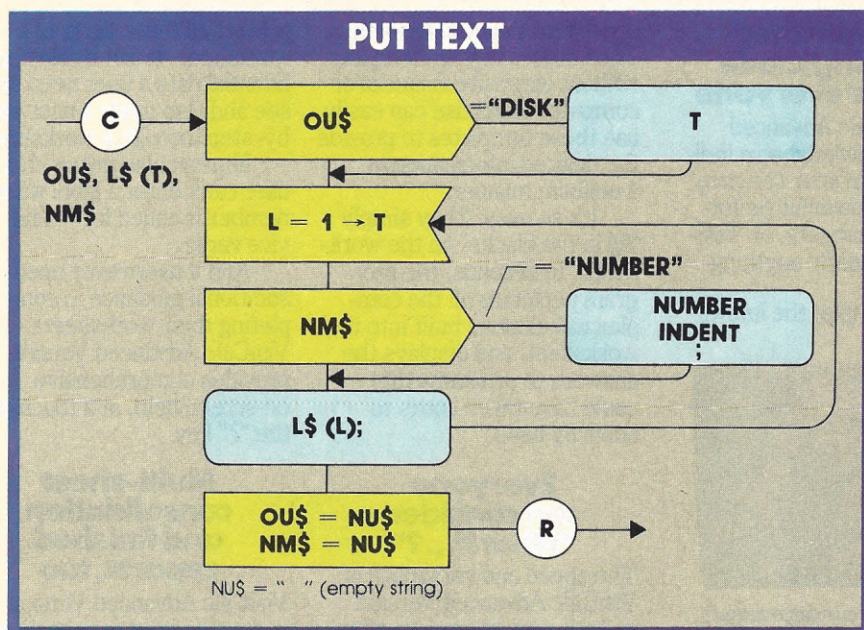
Visit your nearest computer store for a demonstration of VisiCalc Advanced Version. Or write us at 2895 Zanker Road, San Jose, CA 95134 for a copy of our brochure.

Discover how easy it is to use electronic worksheets in your company for problem-solving, company-wide.



VISICORP™
PERSONAL SOFTWARE™

“Whenever a problem gets too big, just break it into pieces and attack each piece.”



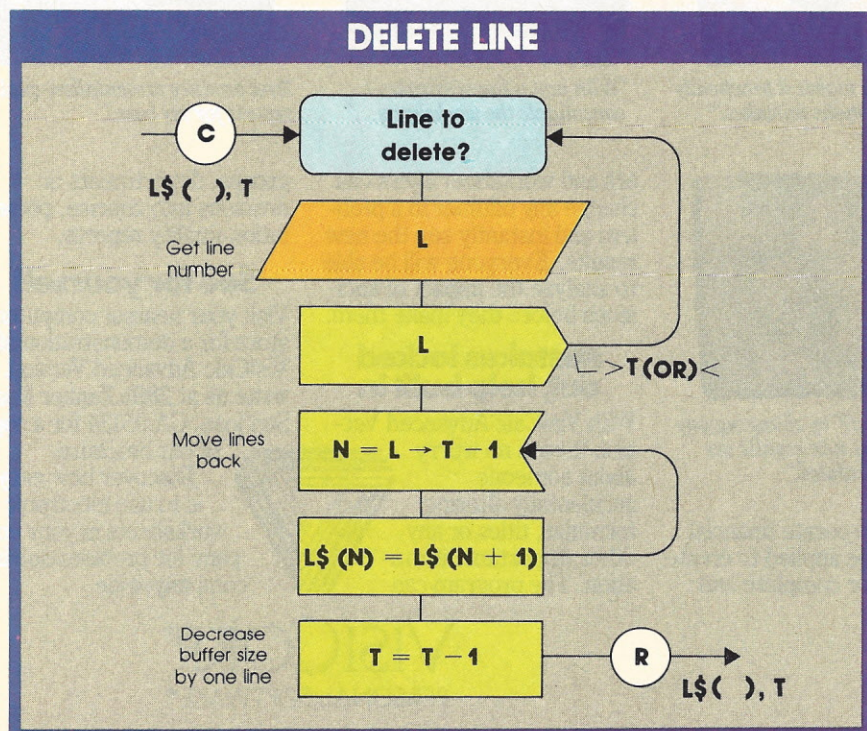
Put a record L\$ (1 → T) on some output device, OU\$. If disk output, then write the total number of lines, T. Number lines if requested with NM\$.

PROGRAMMING

(continued from page 135)

plete routine would have to analyze each character. Certain characters

would have to be screened out, so to speak, and the special key that causes return to the memo menu would have to be caught. And each accepted



character would have to be counted and compared with the screen width so that the right margin would never be crossed.

Since the program was getting complicated again, I broke this problem into two parts. I decided to write one routine to get a line from the user, and a higher level routine that would keep getting lines until some key like ESC or BREAK was pressed. Here is the routine for filling the text buffer that I named INPUT TEXT that calls the GET LINE routine (page 134).

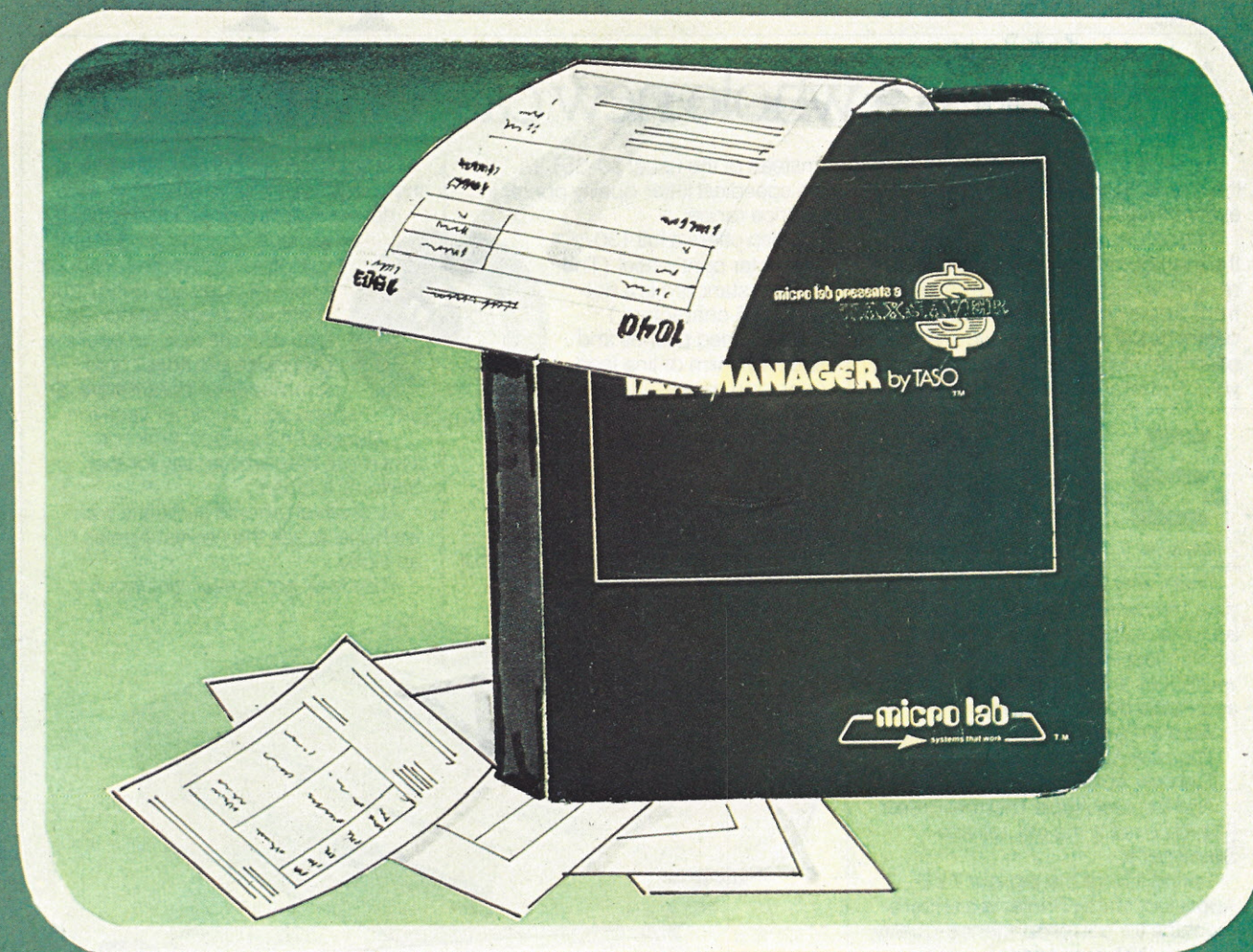
```
10 PRINT "Enter text: "
20 L=0
30 L=L+1
40 GOSUB 1000: REM GET LINE
   RETURN EC$, TS
50 IF EC$="ESC" THEN GOTO 100
55 L$(L)=TS
60 IF L<BS THEN GOTO 30:
   REM If Buffer Size not exceeded
70 ME$="BUFFER FULL"
100 T=L: REM Set total number
   of lines read as T
110 RETURN
```

Since I don't know how many lines will be entered, I can't use a FOR-NEXT loop. So I used the variable L to keep track of which line number is being entered. I set the GET LINE routine aside for later. But there are two things about GET LINE that I do know: The 'gotten' line will be returned as TS, and if an ESC or a BREAK is encountered, the EC\$ flag will be set to "ESC" (see Analyze Character on page 135). If the EC\$ flag is set, my routine will stop inputting lines, set T to the total number of lines read and return control to the menu. If the user enters enough lines to fill the buffer, ME\$ is loaded with the message BUFFER FULL, which will ultimately be printed by the Menu Generator.

A versatile alternative

I soon realized that I could refine and generalize the GET LINE routine so it would be a versatile alternative to

Now your Apple or IBM can
give you complete income tax
planning and record keeping!



And **TAX-MANAGER™**
from Micro Lab lets your
Apple II or IBM prepare
your return—and most
schedules—the easiest,
tax-saving way...and it's
deductible!

- Saves hours of time and effort in tax preparation for individuals and unincorporated businesses.
- Reminds you to take advantage of all deductions.
- Easy to use, even if you've had little computer experience.
- It's "global"—make a change in one figure and all other related figures are automatically changed on the return.
- Automatically selects the tax method/computation that saves you the most.
- FREE one-year Extended Warranty replaces blown disks and gives you updated versions at no cost.

It's Tax Deductible!

AND AVAILABLE NOW...Floppy Disk Version

TAX-MANAGER™

another fine product from
CIRCLE 50

micro lab
systems that work

2310 Skokie Valley Road
Highland Park, Illinois 60035
(312) 433-7550



Inside Apple

Vol. 1 No. 1

Apple adds a whole new cast of characters.

As you may already know, both the Apple® II and III can drive virtually every printer on the market.

Regretfully, not every printer on the market can offer you the same level of service and support you'd expect from Apple. So the same kindly, competent dealer who healed your Apple overnight may have no idea how to fix your Samurai Ichiban daisywheel.



Silentype. Dot Matrix. Letter Quality.

That's why we thought it would be nice, maybe even profitable, to offer a full line of printers that would look like Apples, last like Apples, with Apple warranties and Apple dealer service and Apple documentation.

We even gave them Apple names:

The new Apple Dot Matrix Printer.

The new Apple Letter Quality Printer.

And the new Apple Thermal Printer.

(Which is really the old, reliable Silentype™.)

Taking it from the top, our 7 x 9 Apple Dot Matrix Printer is a superb machine for correspondence-quality printing. With exceptionally legible, fully-formed characters, it gives you a choice of eight different type sizes and five different fonts. It can also give you proportional spacing. Plus boldface printing, underlining, varied pitches, varied line spacing and more.

With 144 x 160 dots per square inch, our Dot Matrix can put all kinds of high resolution graphics on paper—from bar charts and line graphs to digitized portraits.

The Apple Letter Quality Printer, on the other hand, is the preferred machine for just that. In fact, for any word processing or data processing applications where graphics aren't a primary concern.

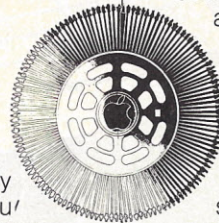
For one thing, it lets you get the words out faster. At a blazing 40 cps

(instead of the usual 30-35), it's the speediest letter quality printer in its price range.

It also offers a full 130-character print wheel. (The current standard is a not-so-full 96 characters.)

Plus varied pitches and spacing, form or line feed, operation pause—seemingly unimportant talents until you discover your machine doesn't have them.

Both the Apple Letter Quality and Dot Matrix printers come with self-teaching diskettes. So your Apple computer can tell you how to use your Apple printer.



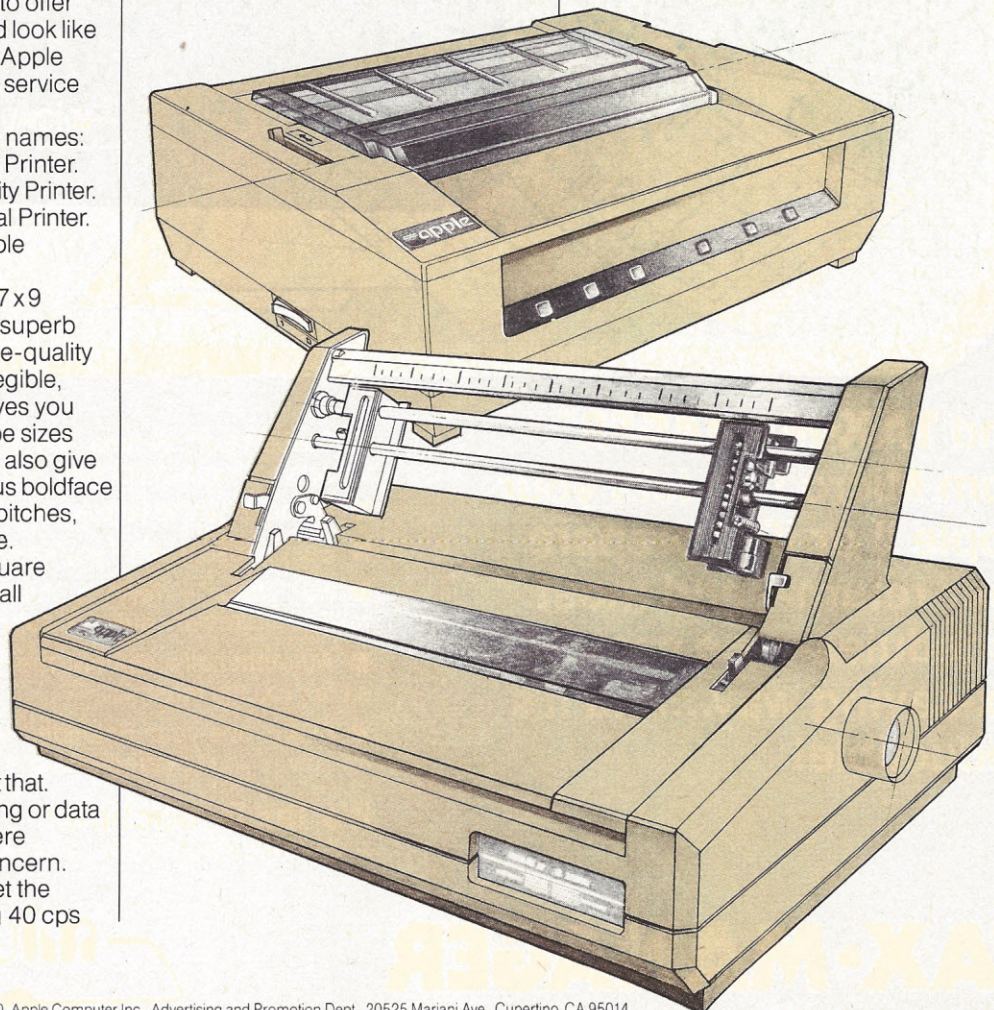
Naturally, all our printers—including the sturdy, inexpensive Silentype™—are deliberately designed to take full

advantage of all the advantages built into every Apple computer.

The interfaces are clean, the electronics compatible. So you don't have to go peeking and poking to adapt print commands or parameters, or spend your summer vacation klugging an interface. Which is a lot more than we can say for the Samurai Ichiban.

All of which should stimulate you, we hope, to see the newest Apples up close.

They look good, even on paper.



(800) 538-9696 (California: (800) 662-9238). Apple Computer Inc., Advertising and Promotion Dept., 20525 Mariani Ave., Cupertino, CA 95014

“Trying to solve too many problems at once is like passing too many cars at once; it’s not worth the mental anguish.”

the INPUT statement. If I made it use variables for the ranges of acceptable characters, (see Input Text Buffer on page 133 for more detail), and for lengths of expected input, along with a flag for line numbering, GET LINE could be tailored for each use. I also wrote it to lay out a line of blanks (underscores), if requested, corresponding to the length of the expected input. So to use GET LINE, all a routine has to do is to set up the variables and flags, call GET LINE, transfer the received line T\$ to the proper variable, and check the ESC flag EC\$ to see if the line was canceled. I eventually put GET LINE into other routines for inputting file names, dates and line numbers.

LINE supplies complete lines to any routine that calls it. The lines are supplied in the variable T\$. But I was able to generalize GET LINE so it is a powerful alternative to the INPUT statement.

First, GET LINE controls the input. Rather than just taking whatever is typed at the keyboard, it screens out any unexpected characters and limits the length of an entered line. Second, I developed a word-wrap routine that grabs the last word of a line, if it stretches over the right margin, and inserts it in the next line. Finally, I made GET LINE outline the line length with a series of underscores if the input is to be only one line (see Layout Field on page 135). Here’s the completed GET LINE routine:

```
660 REM **** GET STRING ****
670 REM IMPORT: LN,FC,LC
675 REM EXPORT T$,EC$
680 REM
685 ES$ = "GET STRING"
690 EC$ = "": T$ = WW$: IF
    OP$ < > "WRAP" THEN
    FOR N = 1 TO LN:
    PRINT CH$(08);: NEXT N
695 PRINT WW$:
700 C = LEN(WW$): WW$ = ""
705 C = C + 1: GET C$
710 IF (C$ = CHR$(27)) THEN
    EC$ = "ESC": GOTO 780
```

```
715 S = 41 - C
720 IF (P2$ = "NUMBER") THEN
    S = S - 3
725 IF (C$ = CHR$(13)) AND
    (PP$ = "TIME") THEN
    S = 41 - 20 - C: PP$ = ""
730 IF (C$ = CHR$(13)) THEN
    PRINT SPC(S);: GOTO 780
735 IF ((ASC(C$) < FC) OR
    (ASC(C$) > LC)
    AND (C$ < > CHR$(08)))
    THEN C = C - 1: GOTO 705
740 IF (C$ = CHR$(08)) AND
    (C = 1)
    THEN PRINT ;: GOTO 690
745 PRINT C$
750 IF (C$ = CHR$(08)) AND
    (C = 2)
    THEN PRINT ;: GOTO 690
755 IF (C$ = CHR$(08)) AND
    (C > 2) THEN C = C - 2:
    T$ = LEFT$(T$,C): GOTO 705
760 IF (C = LN) AND
    (OP$ < > "WRAP")
    THEN T$ = T$ + C$:
    GOTO 780
765 IF ((C = > LN) AND
    (C$ = ""))
    THEN PRINT SPC(S - 1):
    GOTO 780
770 IF ((C > LN) AND
    (C$ < > ""))
    THEN T$ = T$ + C$:
    GOSUB 790: GOTO 780
775 T$ = T$ + C$: GOTO 705
780 OP$ = ""
785 RETURN
```

GET LINE has to make sure that the number of characters entered doesn’t exceed the expected line size, LN. To do this, I made the routine count each character as it was accepted. Afterward, GET command the character count C was compared to LN. If the maximum length was reached, control would be returned to the calling routine. This can be seen in lines 690, 705, 760 and 775.

The screening process

The next step was to screen out unwanted characters and to specially treat specific characters like backspace and ESC. It is important to de-

ASCII CODES

Every character on the keyboard has a corresponding numeric code. This is often called an ASCII code. ASCII stands for American Standard Code for Information Interchange. ASCII codes are useful when you want to represent a weird character in a program like RETURN, ESC, CTRL-Q, etc. To find the ASCII code of a character, you use the ASC () function: For example, say the ASCII code for "C" is 58. A = ASC("C") would give A the value of 58. Conversely, CHR\$() returns the character corresponding to an ASCII code. A\$ = CHR\$(58) would place the letter "C" in A\$.

At the beginning of my program, I assigned any weird characters that I might use to string names. Rather than say CHR\$(27) when I want ESC, for example, I would say ES\$ since at the beginning of my program I did ES\$ = CHR\$(27). Likewise, the return key could be represented by RES = CHR\$(13).

Another advantage of ASCII codes is that they make it possible for the computer to compare the order of certain characters. For example, since "A" has an ASCII value lower than "B," "B" is considered to be greater than "A." Thus, in a relational expression, "SUNDAHL, JOHN" is greater than "MIMAN, OTIS."

In the Desk Master program, the GET LINE routine makes sure that any input character is within the range of FC to LC. If FC is 56 and LC is 95, then all characters must be alphabetic. If not, they are ignored. Computer users’ manuals have tables of ASCII values, usually in their appendices. Here are some of the common character constants used in Desk Master:

```
ES$ = (ESC)
BK$ = (BREAK)
RE$ = (RETURN)
BS$ = (BACK SPACE)
NUS$ = "" (null or empty string)
```


Memory Expansion for Apple®

The company that brought you the first 32K RAM board for Apple II® and Apple II+® now offers:

VC-EXPAND/80™

NEW!

**80 column
VisiCalc® display
on an Apple II !!**

Now in addition to greatly expanding your workspace you can add 80 column capability to Personal Software's 16 sector VisiCalc®. Works with Videx 80 column card. Previous owners of VC-EXPAND™ can upgrade to VC-EXPAND/80™ for \$25.

ONLY

\$125

VC-EXPAND™ MEMORY EXPANSION FOR VisiCalc®

Expand memory available to Personal Software's 16 sector VisiCalc®. Add 32K, 64K, or even 128K to your present workspace (even if you already have a 16K card in use!) with this program plus one or more Saturn boards. Simple operation.

ONLY

\$100

■ 128K RAM

ALL FOR ONLY

\$599

Our newest product. Fully compatible with Saturn's 32K RAM board, 16K RAM cards and language card.

Includes 5 comprehensive software packages:

1. MOVEDOS (relocates DOS)
2. RAMEXPAND (for Applesoft®, Integer®)
3. PSEUDO-DISK for DOS 3.3 or 3.2
4. PSEUDO-DISK for CP/M®
5. PSEUDO-DISK for PASCAL

■ 64K RAM

\$425

A medium range memory expansion board which can be upgraded to 128K at a later date. (Upgrade kit sold for \$175) Includes all 5 software packages offered with the 128K board.

■ 32K RAM

STILL ONLY

\$239

The old favorite for Apple users. Includes our first 3 software packages (above) with CP/M® and PASCAL pseudo-disks now offered as options (\$39 each).



**SATURN
SYSTEMS™**
[313] 973-8422

P.O. Box 8050, Ann Arbor, MI 48107

ADVANCED

test the ESC key first, since if it is encountered, a flag is set and control is returned to the main program.

Unlike INPUT, the GET command does not echo its input. When the computer accepts your character with the GET command, that character is not displayed. But here a backspace or valid character must be echoed to the screen so the user can see what's going on. This is done in line 745.

Line 755 decrements the counter by 2 if a backspace is entered. One count is subtracted for the backspace, and one is subtracted for the deleted character. The LEFT\$ function is used to extract the deleted character.

As soon as I had completed these tasks, I was confronted with the problem of word wrapping. I saw that if I had a word overhanging the right margin, LN, I would need to call a routine that would extract the word from T\$, erase it from the screen and place it in a variable, WW\$, which would be used later. If GET LINE were called again, as would be the case with INPUT TEXT, the beginning of the saved word could be inserted into T\$, and the character counter could be advanced by the length of the word fragment. Here's the WORD WRAP subroutine.

```
790 REM **** WORD WRAP ****
795 REM IMPORT T$, LN
800 REM EXPORT T$, WW$
805 REM
810 LN=LN+1
815 C=LN: WW$=""
820 C=C-1: C$=MID$(T$,C,1)
825 IF (C$="") THEN
    WW$=RIGHT$
    (T$,LN-C):T$=LEFT$(T$,C):
    HTAB 1: PRINT M$:T$:
    GOTO 845
830 IF (C>1) THEN GOTO 820
835 WW$=""
840 IF (LEN(T$)=>LN) THEN
    T$=LEFT$(T$,LN): PRINT
845 RETURN
850 REM *****
```

WORD WRAP counts backward from the end of T\$,LN, looking for a

COMING NEXT MONTH

Comfortable Computing

Computers extend the human mind, but the body has to fit in, too. We'll share what users have learned—sometimes the hard way—about furniture and workstation configurations.



"The job's fine, George. Best of all, I only have 16 years, 2 months, 5 hours and 32 minutes left before I can retire."

ON LINE COMPUTER CENTERS.

Because you'll never be satisfied working for someone else.

Let's face it. You want to own your own business. And since you want that business to be in a field that's growing, you want to get into computers. But unless you're in computers now, armed with years of product experience, how do you do it? An On Line Computer Centers franchise, of course.

If you know business, we'll teach you computers.

We give every On Line franchise owner 3 full weeks of intensive training. And we insist that all of our major manufacturers be there to teach you, too. The final week of training takes place in your own store and we'll be there with you for your Grand Opening.

On Line gives you important business advantages too.

When you become an On Line franchise owner, you can count on:

- Professional marketing and advertising support.
- Special marketing methods to unlock all three major markets. Not just the home user market, but the expanding market for computers in small businesses and professional offices too.
- A product mix so well targeted to those markets that you need only maintain

a select, manageable inventory.

- A total product—both hardware and software—so you can serve all of your customers' needs.

An On Line investment ranges upward from \$174,500—approximately 40%-60% of this in cash. Find out more. Just staple your business card to the coupon and mail it to us. We'll send you information about what your future in computers could be. No obligation, of course.

If you're finally ready to do it for yourself, look what On Line has in store for you.

I want to know more. Please send me information about On Line Computer Centers.

Name _____

Address _____

City/State _____ Zip _____

ON LINE
COMPUTER CENTERS™
1201 San Luis Obispo Ave.
Hayward, CA 94544
(415) 487-2300

PCO

CIRCLE 88

"The insights gained from first outlining the program make the extra thinking worthwhile."

PARAMETERS AND FLAGS

A subroutine can do different things, depending on the value of certain variables when control is transferred to the subroutine. For example, the GET LINE routine uses the variables FC and LC to check the validity of a character. FC is the ASCII code of the first acceptable character and LC the last. If the ASCII value of the given character is between FC and LC, as shown in the GET LINE flow chart, then the character is accepted.

Depending on how FC and LC are set when the GET LINE routine is called, different character groups will be expected—alphabetic, numeric, or both. Values passed into a routine for its reference are known as parameters.

A flag is a variable that has one of two values. For instance, the GET LINE routine sets EC\$ to ESC if the ESC key is detected. If not, EC\$ remains blank or equal to NU\$ (see character codes). Unlike a parameter, which can take on a whole range of values, a flag can only have two. Thus a flag is analogous to a binary digit (which is the same as a bit). This binary digit can be only yes or no, but nothing in between.

In some programming languages, notably FORTRAN, there is a variable type called LOGICAL. BASIC has only real and integer numbers, and characters. Logical variables are assigned only one bit position in FORTRAN, and hence really can take only two values, 1 and 0. In Desk Master, I had to use variables that could be assigned any value up to the maximum permissible. This isn't a problem, really, as long as I take care not to assign values other than the right ones to my flags. If memory space were a problem, I would use integer variables as flags, since they take up less memory space.

blank. When the blank is found, in line 825, then we know we found the beginning of the word. At this point the RIGHTS function is used to put the word fragment into WW\$, which will be passed back to GET LINE. The LEFT\$ function cuts it off the input line so that line is no longer than LN. At this point I thought that WORD WRAP was cleverly done, but I had forgotten to wipe the word fragments off the screen. I added the rest of line 825 to take care of that. MAS\$ is the number margin in case the line is numbered (see the Number-Indent flow chart on page 134). Line 840 takes care of the situation when a word takes the whole line and, thus, no space would be found.

I also decided the string array L\$() could be used whenever a text buffer was needed, for appointments and cards in the index file, for example. I chose the length of this buffer as 50 lines with the constant BS in the beginning of the program. You can change this length, but I figured 50 lines was about all that a user could keep track of without page-control routines. (Otherwise, the screen would always be filling up before the user could get a chance to read his document.) I knew, too, that if the buffer got too big the program could run out of memory and abort. And, since I expected memo-size documents, 50 lines seemed like enough. You certainly have the option of expanding the buffer and adding page control routines that stop the screen whenever it fills up with information. Page control should occur in the PUT TEXT routine which displays the text buffer (page 138).

Easy user-interaction is a tough programming problem. I had to ask myself how I could make it possible to change text in a common-sense way for the user that was efficient of computer resources. The simplest scheme that I could think of goes as follows. First the buffer is displayed on the screen with each line numbered. Then the program displays a

choice of options like this:

Change (C), Insert (I), Delete (D), or Append (A)?

I made this menu horizontal so it could be displayed with the text buffer. Once an option is chosen, the appropriate correcting routine is called. These routines request a line number and accept the change. All the change routines simply input new values and place them in the buffer. For example, the CHANGE LINE routine displays:

Line number to change? —

It uses a routine called GET VALUES which uses GET LINE to read the line number (explained in an upcoming article on the appointment calendar article) into L, redisplay the line to be changed:

PRINT L\$(L)

reads the new line with GET LINE, and does the replacement:

L\$(L)=T\$

since T\$ is always provided by GET LINE.

The insert and delete routines are similar, but they must push other lines in the buffer forward or backward to accommodate a new line or cover an old one. I accomplished this with a loop where L\$(N)=L\$(N-1) or L\$(N)=L\$(N+1) (see Delete Line on page 138).

The routine that prints the buffer on the printer was the easiest routine to write. It simply involved turning on the printer (which is done differently on every computer, so consult your program or manual), calling PUT TEXT (shown in the flow chart on page 138), and then turning the printer off.

Further articles about Desk Master will explain the process behind the programming of the appointment calendar and the calculator. But, in the meantime, if you have any questions about the portions of the program I've explained so far, send them to me, Leon Starr, in care of *Personal Computing*, 50 Essex St. Rochelle Park, NJ 07662. I'll try to get answers to you.



WHAT CAN YOU GET
FOR THE PERSON WHO HAS EVERYTHING
BUT STILL WANTS MORE?
THERE IS ONE PERFECT GIFT . . . IT'S

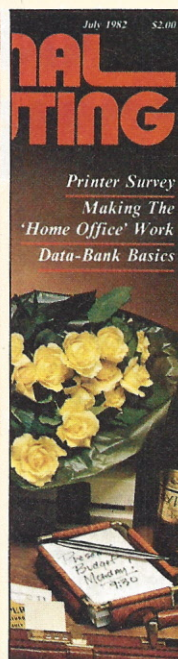
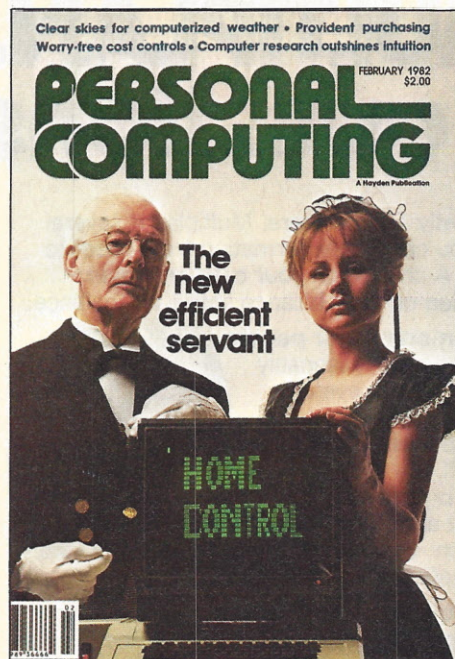
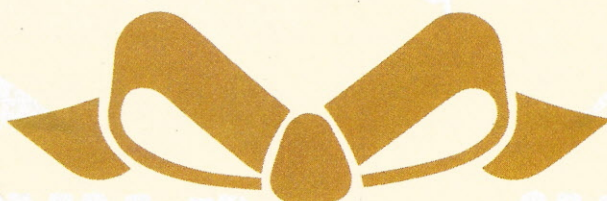
PERSONAL COMPUTING

PERSONAL COMPUTING Magazine combines lively, enjoyable writing with technical expertise and in-depth industry coverage to explore and explain what's happening in personal computing, what you can do with personal computing, and how to do personal computing.

For \$11.97 you can give twelve months of PERSONAL COMPUTING. Think about it . . . that's at least 3000 pages totally devoted to the

powerful, new world of personal computing: 96 feature articles; 12 interviews with industry giants; hardware, software, peripheral, service and book reviews every month; regular tutorials you don't have to have a Ph.D in Computer Science to understand; lots of answers; thought-provoking essays and glimpses into a future guided by personal computing.

Basically, there's not much MORE you can give . . . for \$11.97.

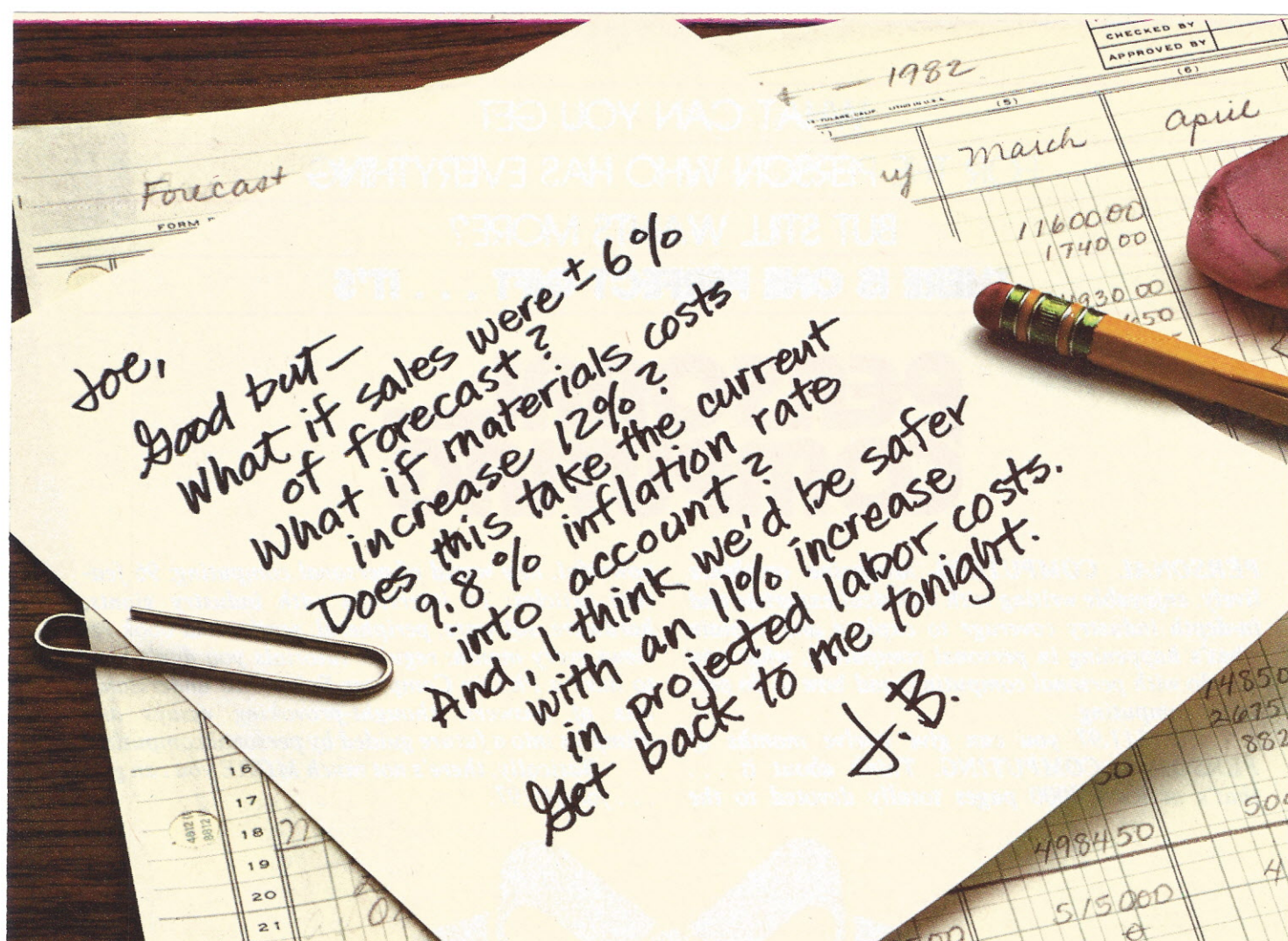


THIS HOLIDAY SEASON YOU CAN GIVE, AND GET, MORE WITHOUT SPENDING MORE.

If you buy one or more gift subscriptions to PERSONAL COMPUTING Magazine at \$11.97, you can renew your own subscription at the incredibly low price of \$9.97.

Share the joy.

Use the convenient postage-paid cards opposite to order your gift subscriptions today.



Now, Microsoft MULTIPLAN.™ toughest questions

Better tools. If you're answering "What if..." questions with a pencil, eraser, calculator and endless manhours, Multiplan gives you a better set of tools.

Fast answers. Multiplan is a software program that turns a microcomputer into an answer machine. Multiplan starts as an open "worksheet" of rows and columns. Each intersection of row and column, or "cell," in the worksheet will accept titles, names, numbers or formulas. As you assign names or values to cells, you build a worksheet for a particular problem or set of problems. You establish the logic. Multiplan assigns the time-consuming calculations to the computer. Which means you get answers. Fast.

Simpler, faster, more powerful.

Multiplan is a completely interactive electronic worksheet. Change one number or formula, and you change every number that

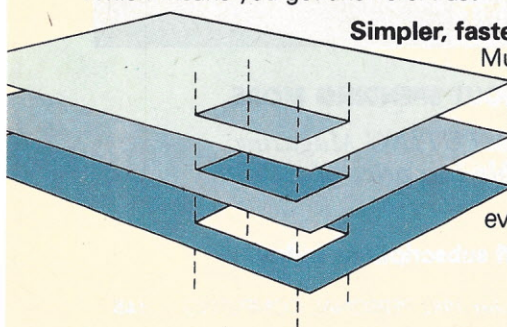
depends on it. Instantly. Furthermore, Multiplan is several worksheets deep. You can pass information from sheet to sheet automatically. A change on your cash and receivables sheet is reflected on your balance sheet, for instance.

Computing for non-computer people.

You can use Multiplan on a reasonably priced personal computer...even if you've never used a computer before. Plain English "prompts" direct you through each step. If you need additional help, just press the "?" key. Information that addresses your specific question will appear on the screen. Get your answer and return to the problem. Without leafing through a manual.

Logical problem solving. Multiplan allows you to assign English names to represent one or more cells on the worksheet. That way, you can refer to items the way you think of them. Profit equals "Sales minus Expenses" for instance. Instead of "L14 minus M17."

Watch what's happening. The computer screen displays a portion of a giant worksheet that's 63 columns wide by 255 rows deep. In addition, you can open multiple "windows" to other areas of the worksheet. That capability allows you



ACCOUNTING...

*the Language of Business
spoken here!*



SOFTWARE FOR FINANCIAL MANAGEMENT

We make it easy! Plus Accounting Software Packages are menu-driven for easy and confident operation. Our extensive documentation for installation and operation is easy to understand. And, Plus is easy to buy, we are amazingly inexpensive. The Plus technical support package with our 800 number "hot-line" makes it easy to stay up-to-date and informed.

Select a package for a specific application, or get the total system. You can be sure your professionally-designed Plus Accounting Software Package will provide efficient, cost-effective financial management for your most demanding needs. Make a sound business decision today...make your financial control and planning management a Plus. We speak your language.

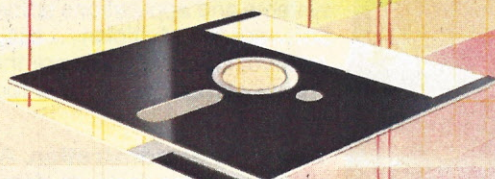
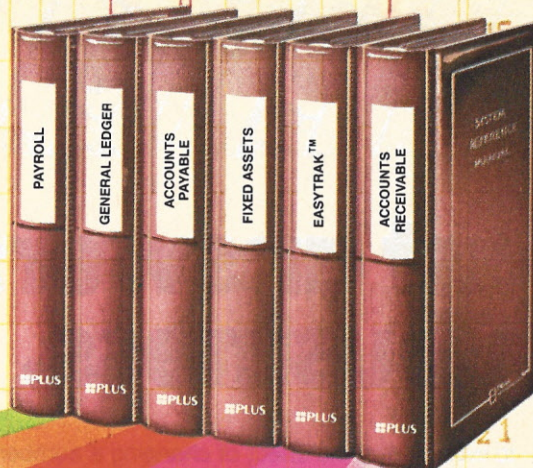
PLUS FINANCIAL AND ACCOUNTING SOFTWARE PACKAGES AVAILABLE:

- GENERAL LEDGER • ACCOUNTS RECEIVABLE
- ACCOUNTS PAYABLE • FIXED ASSETS
- PAYROLL • EASYTRAK™ ACTIVITY MONITORING SYSTEM

All packages menu-driven. Each accounting package is available "stand alone", or can automatically post to General Ledger. Flexible user-defined file sizes for flexibility. Complete with extensive documentation and thorough installation guide. Furnished on disc.

PLUS PROGRAM AVAILABILITY:

- TANDY MODELS II & III
- THE IBM PERSONAL COMPUTER



PLUS COMPUTER TECHNOLOGY, INC.
6900 North Austin Avenue—Chicago, IL 60648
1-312-647-0988
1-800-323-4240 (Outside Illinois)

WHAT WE DO FOR YOU IS OUR
MOST IMPORTANT PRODUCT.



Pocket Programs That Make Short Shrift Of Complex Problems

by Roy Katz

BASIC FOR BUSINESS

DOUGLAS HERGERT
SYBEX BOOKS
BERKELEY, CA
223 pp., \$12.95

SCIENCE AND ENGINEERING SOURCEBOOK

CASS LEWART
MICRO TEX PUBLICATIONS
NEW YORK, NY
91 pp., \$9.95

These two programming guides approach the subject from different perspectives. In the *Science and Engineering Sourcebook*, Cass Lewart, a professional communications engineer, provides 25 actual programs that can be run on the new pocket computers. In *BASIC for Business*, Douglas Hergert walks the reader through several practical business

programs as he explains why and how they work.

Science and Engineering Sourcebook is designed to help engineers, analysts, mathematicians and anyone else who makes extensive use of complex formulas on a regular basis. Its 25 programs cover formulas in electrical engineering, queuing theory, reliability, curve-fitting, statistics, graphic generation, number theory, computer science, artificial intelligence and related technical areas. These programs were specifically written to run on TRS-80 and Sharp PC-1211 pocket computers; however, the book has an appendix with information necessary to convert these programs to run on other computers that use BASIC.

The programs that many pocket-computer owners will find especially useful are the Decimal to Binary Fractions and the two User Checking

Account programs. The Decimal to Binary Fractions program, Lewart explains, will "accommodate both the 'decimal' and the 'binary' world population; this program will translate a decimal fraction into its binary equivalent." The Checking Account program enables users to easily balance two separate checkbooks against the monthly bank statement.

BASIC for Business is written for the businessperson who wants to know how and why programs work. It approaches the study of BASIC from the businessperson's perspective; that is, it guides the reader through the development of several practical business programs, including a cost of goods sold inventory program, break-even point analysis, T-ledger accounts, depreciation and basic statistical analysis programs.

Unlike other books on programming which introduce a series of

DISASTER INSURANCE.

PROTECT YOUR HARDWARE FROM THE UNEXPECTED.

Not to mention the unavoidable pollutants in the air. Performance robbing dust, grime, spills and static electricity.

Cover Craft Dust Covers help extend the useful life of your computer equipment at a fraction of the cost. Perhaps that's why more people throughout the world rely on Cover Craft Dust Covers than any other brand.

Visit your local dealer or contact Cover Craft.

Dust Covers for most terminals, disks, printers, modems, etc.

\$8.95-\$15.95
Shipping extra.



COVER CRAFT CORP

PO Box 555, Amherst, NH 03031 • (603) 889-6811



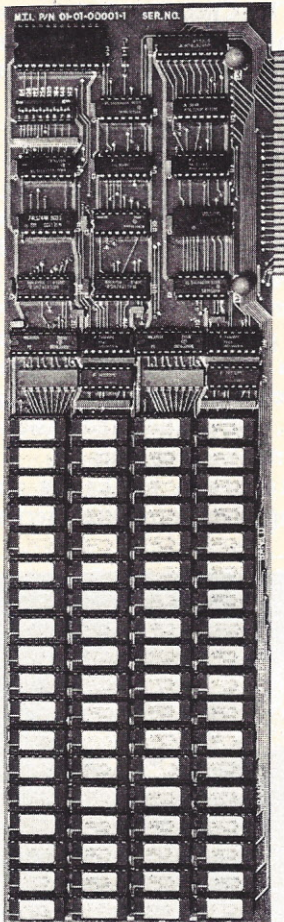
CIRCLE 58

COMING NEXT MONTH

As Christmas Draws Nigh

Santa might want to think about a super family gift. What are the considerations for the family system—a system for the home? We'll give you some alternatives to ponder, together with some hints to drop in case Santa wants to receive as well as give.

IMPROVE YOUR IBM PC'S PERFORMANCE: Install the Versa-RAM® Memory Board!



To get the most out of your IBM PC, you need a memory board that expands to meet memory requirements as your system grows... and that means the versatile, expandable Versa-RAM!

- up to 512k bytes of error-checked memory on one board
- entirely assembled and tested, full year warranty
- fully socketed for future expansion
- completely compatible with all available hardware and software
- easy, five-minute installation
- fast delivery from stock

At unbeatable prices! 64k \$399, 192k \$619, 256k \$729, 512k \$1169, 64k expansion chip set \$125. Other versions available.

FREE with 192k and larger versions: Versa-Ware™ RAM disk and print spooler software package.

New! Versa-RAM-Plus multi-function memory + I/O board, expandable 64k-to-256k (prices \$565-to-\$895), with two RS-232 serial ports, one parallel printer port. Supports all IBM software. Software support package included in price.

IBM is a trademark of International Business Machines Corp.

Available at ComputerLand and other IBM PC dealers. For more information or name of your nearest dealer, call us toll free 1-800-348-3377 (Indiana 219-664-5741).



Memory Technologies, Inc.

25 Main Street • Box 6A, Twelve Mile, IN 46988

Toll free 1-800-348-3347 (Indiana 219-664-5741)

CIRCLE 64

BOOK REVIEWS

often confusing concepts in each chapter, Douglas Hergert avoids this problem by concentrating on only one syntactical feature of BASIC per chapter, fully explaining its use with easily understood illustrations. For example, in discussing the debugging of BASIC programs the author writes: "Programming bugs come in two varieties—syntactical and logical. A syntactical bug is a misuse of the programming language itself—misspelling a reserved word, punctuating incorrectly, or failure to adhere perfectly to the strict grammar of the programming language." And on logical bugs, the author says: "Generally such bugs appear in exactly the routines that the programmer was certain were perfect. Because most logical bugs are completely unexpected, half of the task of correcting them may simply lie in locating them in the program." What could be easier to understand?

While *BASIC for Business* concentrates on the effective use of BASIC in business programs, it also has brief explanations of the important differences between BASIC and other languages such as FORTRAN and COBOL. In addition, Hergert has written a series of comprehensive review questions at the end of each chapter, designed to test and sharpen the reader's understanding of important concepts.

Get the upper hand on your Apple

APPLE II USER'S GUIDE

LON POOLE, MARTIN MCNIFF &
STEVEN COOK
OSBORNE/MCGRAW-HILL
HAYWARD, CA
385 pp., \$15

Before powering up your Apple II, reach for a copy of the *Apple II User's Guide*. Lon Poole, Martin

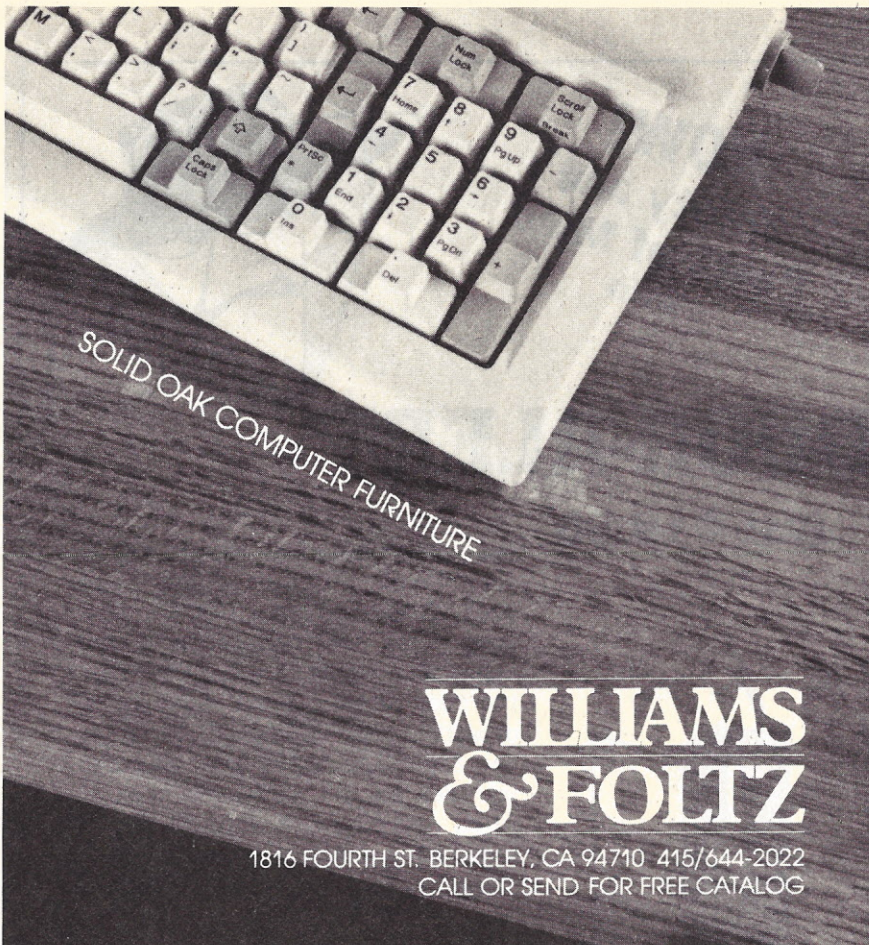
McNiff and Steven Cook have written an exhaustive hands-on resource book—must reading for every Apple II owner. Like the authors' companion volume, *Your Atari Computer*, the *Apple II User's Guide* shows readers how to make their Apples operate at peak efficiency, and what to do when things go wrong.

The book is designed to help readers avoid and overcome problems that arise when using Apples. For example, the authors maintain that sooner or later everyone accidentally presses the Reset key, causing the system to crash. The book then offers two simple suggestions for making it harder for this to happen: First, simply remove the plastic keytop which leaves only the keyshaft exposed; and second, remove the keytop, but insert a 3/8-inch washer around the keyshaft flange and replace the keytop. The authors say this washer makes the Reset key harder to press; therefore, it allows for fewer accidental resets.

"The Apple II is a marvelous piece of equipment," the authors write, "but it shares a problem common to all computers—it lacks imagination." The *User's Guide* thus devotes four extensive chapters to all areas of BASIC programming, both introductory and advanced, in the hope that readers will supply this missing ingredient.

In presenting their study of BASIC, the authors concentrate on how the rules of BASIC are combined and used to write practical programs. The *Apple II User's Guide* focuses on clean programming and operating procedures through simple common-sense rules. One rule, for instance, is to always use plenty of program remarks; another is to enter whole functional blocks of data and then process them, rather than processing line by line.

The chapters on using disk drives and Machine Language Monitors are among the best. Although highly technical, the authors explain everything with ease and clarity. Poole,



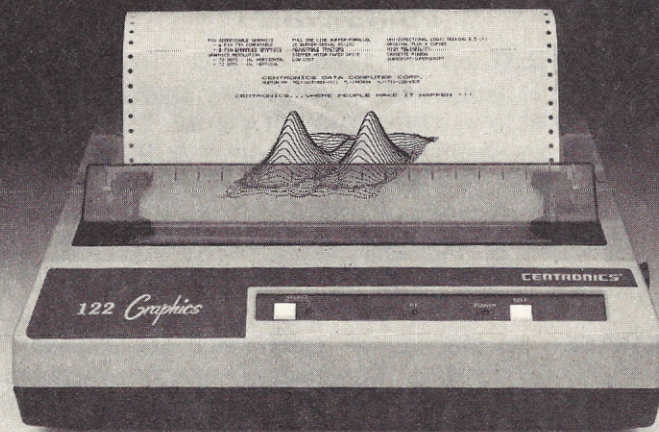
SOLID OAK COMPUTER FURNITURE

**WILLIAMS
& FOLTZ**

1816 FOURTH ST. BERKELEY, CA 94710 415/644-2022
CALL OR SEND FOR FREE CATALOG

CIRCLE 62

THE NEW CENTRONICS 122 GRAPHICS PRINTER.



RELIABILITY. The "122 Graphics" features the same technology that has made Centronics printers No. 1 among OEMs—the computer pros.

BUILT-IN FEATURES. The add-on options of competitive printers are built into the commercial grade "122 Graphics." Adjustable tractor width, forms handling—up to 5 parts, 132 column paper width, business and image graphics 6- and 8-pin switch selectable, off-the-shelf software and more.

SERVICE. Centronics has more factory service and walk-in service centers than anyone else in the business worldwide.

PRICE. Comparable to the top of the line toys when you add the options that are standard on the "122 Graphics."

Whatever your personal computer: IBM, Apple, Xerox, it's a big investment. It shouldn't be playing with toys.

See your nearby authorized Centronics Dealer or Distributor soon for complete details.

CENTRONICS PRINTERS

Centronics Data Computer Corp.
One Wall Street, Hudson, N.H. 03051, Tel. (603) 883-0111

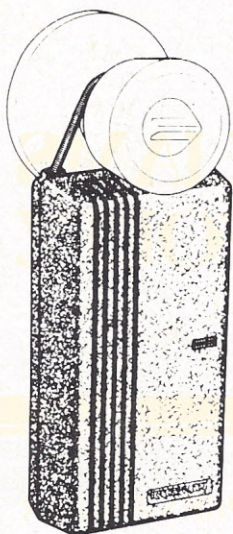
CIRCLE 85

NOW!
Safety and
Peace of Mind
with



DOOR-ALERT

Just \$19.50



Keep the thieves and rapists out of your home! Protect yourself and your loved ones with DOOR-ALERT. Simply slip DOOR-ALERT over the inside door knob. If anyone touches the door with his hand, with a key, or with a tool, DOOR-ALERT will let out a piercing alarm and send the intruder on his way. And then it turns off automatically so that it won't keep alarming the neighbors. DOOR-ALERT has a 3-second built-in delay.

This has two purposes:

1. So the alarm won't sound if someone just casually touches the door, and
2. To give you time to deactivate the alarm.

Keep DOOR-ALERT on the inside of your front door both while you are at home and while you are away. Nobody will be able to enter your home. And, of course, it is something you should have with you on your travels. DOOR-ALERT is beautifully styled. It measures 4½ x 2 x 1 and takes up almost no room. It works on one 9-volt cell (not included). It costs just \$19.50. (you get two for \$34.50) plus \$2.00 postage and handling — a great investment for PEACE OF MIND.

GUARANTEE: Satisfaction is completely guaranteed! Use DOOR-ALERT for 15 days. Not pleased? You owe nothing — not even an explanation. Just return for complete, prompt refund. You have everything to gain, and nothing to lose. In fact you'll wonder how you ever got along without DOOR-ALERT.

Yes! DOOR-ALERT is for me. Please send me _____ units at only \$19.50 each, plus \$2.00 postage and handling (California residents please add 6% sales tax).
Total \$ _____ enclosed.

NAME _____

ADDRESS _____

CITY _____

STATE _____

ZIP _____

SEND TO: DOOR-ALERT

6333 Woodman Avenue
Van Nuys, CA 91401

BOOK REVIEWS

McNiff and Cook have written a book that can be easily understood by the beginner, yet it is also filled with the technical information experienced users require. While it is difficult to be all things to all readers, the authors manage to pull this off effortlessly—this makes for a solid, highly readable volume.

Small machines that shrink office overload

HOW TO PROFIT FROM YOUR PERSONAL COMPUTER

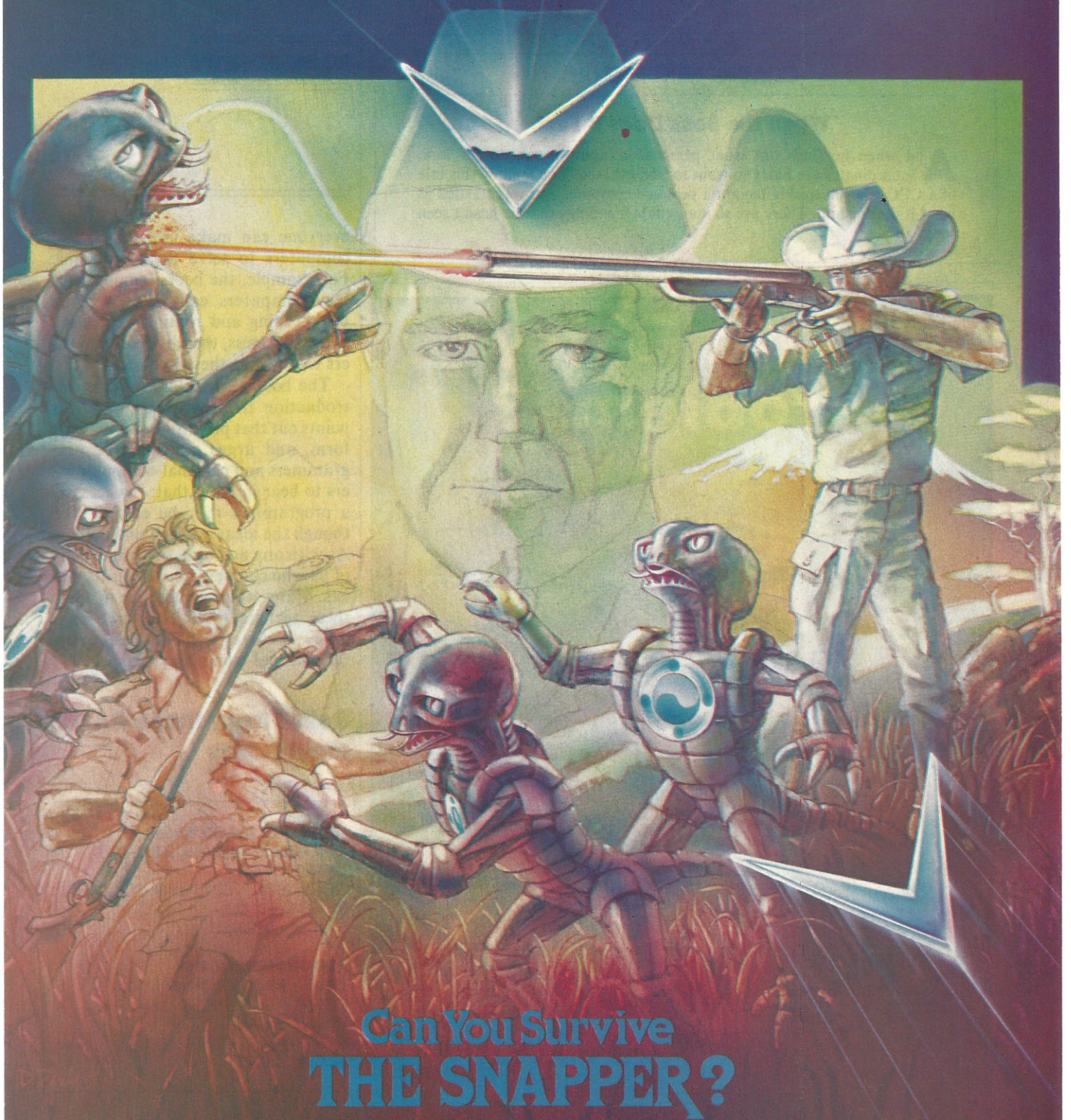
T.G. LEWIS
HAYDEN BOOK COMPANY
ROCHELLE PARK, NJ
192 pp., \$11.75

Here is a little book that provides the non-technical reader with a solid foundation in the use of personal computers in small businesses or professional practices. Ted Lewis cuts through the technical computer jargon, and writes an informative book which explains what the systems can, and cannot do, and what first-time buyers need to know about the machines before they buy.

How to Profit from Your Personal Computer describes several common business problems, showing how they can easily be solved with personal computers. Lewis sums up these problems in his business "Rules of Expansion." They include: "Inventory expands to fill the warehouse. Mail expands to fill the post office. Patients expand to fill the clinic. And pocket calculators expand to fill the office."

The author also provides some case histories of businessmen who overcame these and similar problems using their personal computers.

According to Lewis we are in "the age of common computing" in which



Can You Survive THE SNAPPER?

As the clock ticks down the game begins, and danger closes in...

To survive you must leave base in search of the blots.
The more blots you eat the more points you make.
But time is against you! You must return to a base
before time runs out.

Can you get back?

The grid is filled with danger—get caught in a Gamma-
Field and you are annihilated.
Roaming whirlers will blast you off the grid.

The grid will disintegrate before your eyes—but find the
magic ring before it disappears and the grid will be
restored.

What next?!

The longer you survive the more treacherous and
slippery the paths become.

Beware... You are about to enter the **SNAPPER**™ zone.
For **The Snapper** see your Apple® dealer.

**Simply the best...
Silicon Valley Systems**

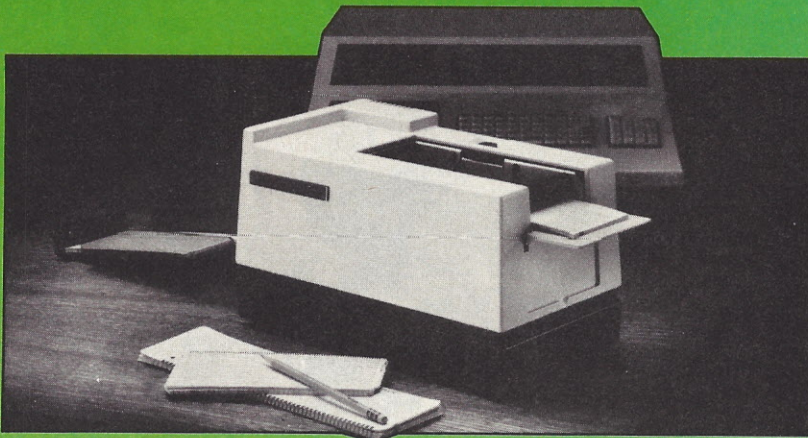
Apple is a registered trademark
of APPLE COMPUTER, INC.

COMING NEXT MONTH

When the Boss Does It First

And when he finds out what personal computing can do for him, subordinates are likely to want to find out, too. You'll enjoy this tale of a CEO who sheepishly bought a personal computer and was startled at what it did for him. There are so many happy endings that he hasn't seen them all yet.

Data Entry Problems?



Our New 2000 Series Solves Them...5 Ways!

1. EASE OF DATA ENTRY

Enter data into your personal computer by simply marking standard cards with a pencil. No special training needed. The 2000 Series even reads pre-printed data and punched holes.

2. USER FRIENDLY DESIGN

The 2000 comes with 2 different interfaces: an intelligent interface for the Apple and an RS-232C. Both models simplify user software by converting card data easily to one of 4 different modes, or any combination of them: ASCII, Card Image, Quick Program and Self Programming. Makes your programming tasks quick and easy.

3. AUTOMATIC FEED

The 2000 Series reads up to 60 cards per minute, automatically! Just load the feeder tray and the 2000 does the rest. Cards can vary in length from 5 to 12 inches, and each one can contain up to 128 columns of data.

4. LOW COST

The cost, including a choice of interfaces, is only \$1595. Compare that to keypunch or computer terminals, plus the expense of operating them.

5. RELIABLE OPTICAL SENSOR

State-of-the-art fibre optics "read" each card reliably and accurately, with a single, long-lasting bulb providing the light source.

So, to quickly solve your data entry problems, put in your order now for a new 2000 Series. It's ideal for education, medical, business, and a host of other computer applications.

And remember... whatever your needs, Chatsworth Data still offers the industry's largest selection of card readers. Write or phone for complete details...today!



**CHATSWORTH DATA
CORPORATION**

20710 Lassen Street Chatsworth, California 91311 Phone: (213) 341-9200

BOOK REVIEWS

everyone can make use of personal computers to solve their problems. For example, the book demonstrates how computers can take over the bookkeeping and routine paperwork of any business, thereby freeing owners to do what they do best.

The book also includes a brief introduction to programming. Lewis points out that programming is an art form, and urges all would-be programmers and personal-computer users to bear in mind that: "Success as a programmer may be elusive even though the ideas are well understood. As with any art form, there are many of us who can never be one of its artists. Many others will be able to apply these techniques to their own situations, however, and become successful personal-computer owners."

Relief from those BASIC nightmares

LEARNING TRS-80 BASIC FOR MODELS I,II/16, AND III

DAVID A. LIEN
COMPUSOFT PUBLISHING CO.
SAN DIEGO, CA
544 pp., \$19.95

PROGRAMMING THE TRS-80 POCKET COMPUTER

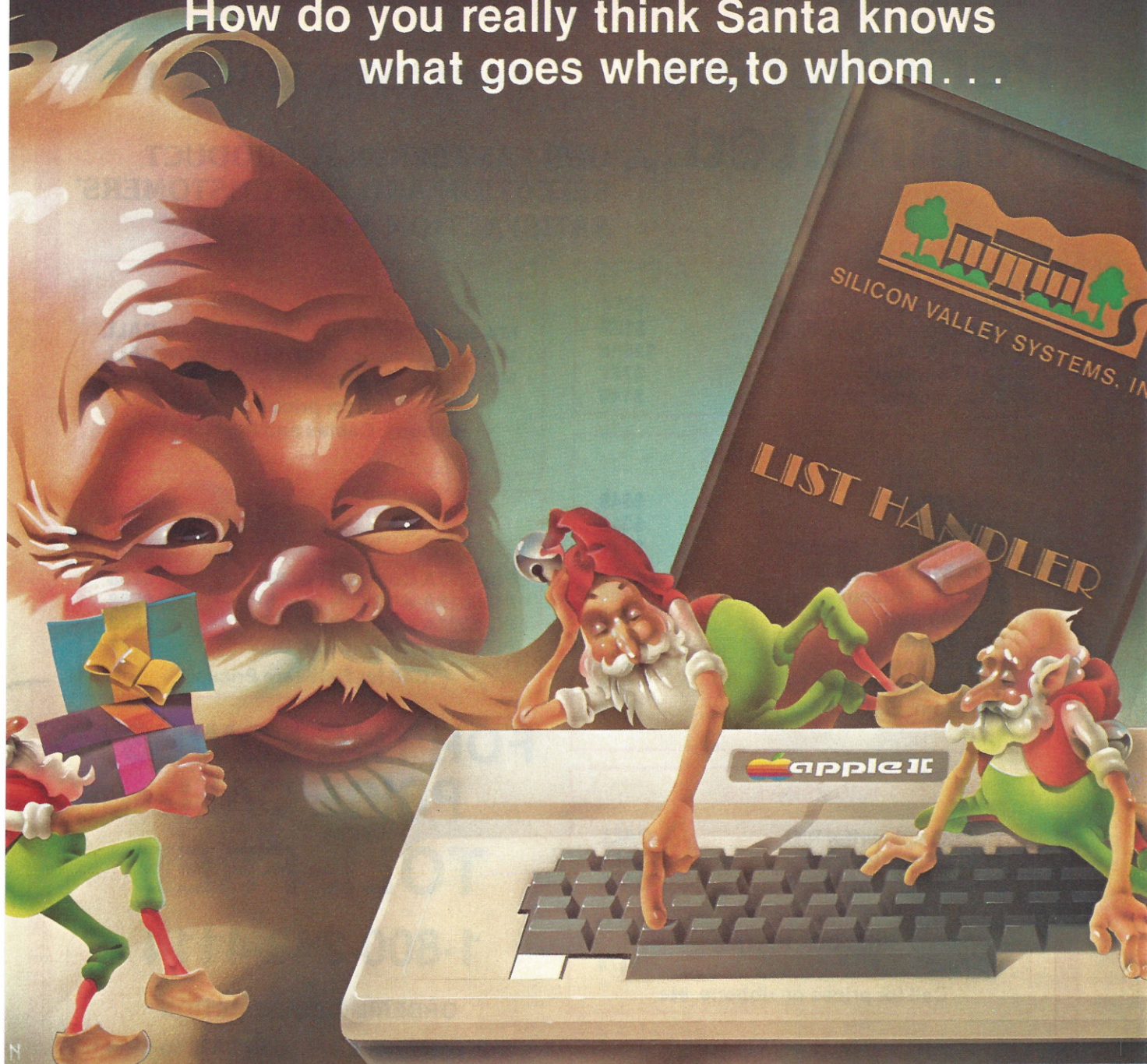
DONALD D. SPENCER
PRENTICE HALL
ENGLEWOOD CLIFFS, NJ
544 pp., \$8.50

Studying BASIC or any computer language can be a boring task; David Lien has turned it into a pleasing and significant experience. His breezy style enables him to get his message across with a smile—"Aha! That's an interesting point, I'll have to remember that."—and impact.

Each chapter is tutorial, and concentrates on one concept, which allows the reader to completely master

CIRCLE 60

How do you really think Santa knows
what goes where, to whom . . .



LIST HANDLER

The List Handler is, **without doubt**, much more than a mailmerge program.

Presto! List Handler turns your Apple® into a quick response file cabinet with room to grow storage space. **With List Handler you can hold up to 3000 records per drive so that 24000 can be kept on-line at the same time with multiple disk drives.**

These records can be addresses if you choose, but here's where the versatility and flexibility come in.

Put what you like on those records!

- inventory
- product lists
- form letters
- short newsletters
- mailing lists
- personnel directories
- invoices
- labels

The list is endless.

The List Handler will run on one or more drives, read and write DIF format and has unlimited sort fields.

List Handler can stand alone or as an interface with your Word Handler (or most other word processors) for the

most efficient word processing duo around.

The List Handler will surprise you, but the first surprise will be the price! **At \$89.95** the List Handler is the best and the only buy of its type around.

The enormity of Santa's job may have you skeptical of Santa's existence—but when you see the List Handler you might just believe in Santa again! See your Apple dealer for the List Handler.

Apple is a registered trademark of APPLE COMPUTER, INC.

**Simply the best . . .
Silicon Valley Systems**

Silicon Valley Systems Inc. 1625 El Camino Real #4 Belmont, CA 94002 415-593-4344

CIRCLE 65

Peripherals

Unlimited...

OUR FAST SERVICE, PRODUCT SELECTION AND OUR CUSTOMERS' SATISFACTION MAKE US #1.

MicroSoft Z-80 Softcard	\$214
MicroSoft RAMCARD	\$129
Z-90-64K DO	\$2588
Z-19 Terminal	\$777
Z-121 Monitor 12"	\$149

ATARI COMPUTERS

Atari 800 16K	\$649
Atari 400	\$318
Atari Interface Module	\$174
Atari 810 Single Disk	\$444
Atari 830 Modem	\$166
Programmer	\$59
Entertainer	\$84
Star Raiders	\$34
16K Mem. Exp. for Atari	\$74
32K Mem. Exp. for Atari	\$114

NEC PRINTERS

7710/30 Spinwriter R/O	CALL
7720 Spinwriter KSR	CALL
3510/30 Spinwriter R/O	CALL

NEC DOT MATRIX

PC-8023	\$474
---------	-------

Call for prices on ribbons, etc.

MORE PRINTERS

Anadex 9500/9501	\$1295
Anadex DP-9000	\$1049
Okidata Microline 82A	CALL
Okidata Microline 83A	CALL
Okidata Microline 84	CALL
Tractor (OKI 80 + 82 only)	\$60
Diablo 630	\$2044

MONITORS

Sanyo 12" GRN Phosphor	\$266
Sanyo 12" Black + White	\$239
Amdek 12" 300 GRN Phosphor	\$149
Amdek 12" Color	\$319
Amdek Color	\$779
NEC 12" GRN Phosphor	\$149
NEC 12" Color	\$344

FANTASTIC PRICES!

EPSON PRINTERS

MX-80 w/Graphics	CALL
MX-80 FT (Friction + Tractor)	CALL
MX-100 (15" Carriage)	CALL

Call for prices on Ribbons, Cables and Interfaces

NEC-PC 8000 Series Microcomputer

PC-8001A Computer w/32K	\$888
PC-8012A w/32K + Exp. Slots	\$588
PC-8031A Dual Mini Disk	\$888
PC-8032A Add-on Mini Disk	\$777

Call for Software Prices

FOR THE LOWEST PRICE CALL

TOLL FREE

1-800-343-4114

ORDERING INFORMATION

Our order lines are open 9AM to 6PM EST Monday thru Friday. Phone orders are welcome; same day shipment on orders placed before 10AM. Free use of Mastercard and VISA. Personal checks require 2 weeks clearance. Manufacturer's warranty included on all equipment. Prices subject to revision. C.O.D.'s accepted.

For service, quality and delivery call:

PERIPHERALS UNLIMITED
(617) 655-7400

62 N. Main St. • Natick, MA 01760

any subject before proceeding. At the end of most chapters there are practical exercises and questions, each designed to reinforce the chapter's main points.

The author maintains a snappy dialogue with his readers as he explains, questions, repeats, and even sets up his unsuspecting and trustworthy readers to err, all in the name of explaining the finer points of BASIC as it applies to TRS-80s. Lien uses crisp, powerful prose to explain BASIC terms when he says, "Integer??? I can't even pronounce it, let alone understand it! Oh, come. Don't let old nightmares of being trapped in algebra class stop you now. It's pronounced in-teh-jur, and simply means a whole number like 5,

0 or 3. How difficult can that be? Come to think of it, some folks make a whole career of complicating simple ideas. We're here to do just the opposite."

And indeed he does. Lien takes beginners through 50 elaborate tutorials covering all areas of BASIC—how it works, and how to write programs with it for the TRS-80. The material is not only presented with the right touch of humor, but more important, it is well written. Readers with no computer background will be able to understand the book easily.

Likewise, Donald Spencer's *Programming the TRS-80 Pocket Computer* is written for the novice computer-user. The book is an easy to use how-to guide that takes readers

step by step through pocket-computer programming.

Spencer points out the TRS-80 Pocket computer is only the first of many models of pocket computers which, in the near future, will become as commonplace as pocket calculators are now. He maintains that pocket computers enable business executives and managers to make the most effective use of their business savvy—they can test several alternatives before choosing one strategy.

Spencer also mentions another, if unconventional, use of pocket computers: gambling. He argues that pocket computers should be mandatory equipment for professional gamblers because the machines can maximize (results not guaranteed) bet-

Simply the best word processor...anywhere"

for the Apple™

no hardware additions needed — What you see is what you get. All functions are displayed on the screen exactly as they appear in print including:

- Underlining
- Bold
- Superscript
- Even/normal justification
- Lower and upper case
- Block movement
- Global replace
- Plus many more features



"Word Handler is simply the best word processing software I could find anywhere by far."
William R. Moroney
President
Electronic Funds Transfer Association

Now Available!
List Handler
A mailing list program to work with the Word Handler (interfaces with VisiCalc™ and DB Master™) stores up to 3000 records per disk, unlimited sorting fields.

Word Handler

Once you buy a Word Handler we don't forget you; our customer service department is available daily. We support our products.

When upgrades are introduced you are supplied with a replacement disk FREE! Contact your local Apple™ dealer for a demonstration. You'll be glad you did.

Silicon Valley Systems, Inc. 1625 El Camino Real #4 Belmont, CA 94002 (415) 593-4344

Silicon Valley Systems

CIRCLE 66

SHAPES — IN — COLOR™



LET YOUR IMAGINATION GO

▶ Create your own animated shapes and figures... paint a landscape... design an alphabet! With SHAPES IN COLOR, you command the power of Hi-Res graphics to produce animations, games, graphic presentations, and more.

Available at your local computer store or
Order by Phone:

1-800-631-0856, Dept. #PC 02

In New Jersey, 201-843-0550, ext. 382
Call us and we will bill your credit card.

● "Paint" graphic backgrounds with free-hand brush-strokes and combine them with moving shapes for a striking effect. Save your designs on disk and reload them for use in other programs.

SHAPES IN COLOR, # 13509, \$49.95
Apple II Disk

HAYDEN SOFTWARE

CIRCLE 170

ting strategies by displaying odds at the track or other statistical information. On a more conventional level, however, the author writes that pocket computers enable engineers to solve sophisticated problems on the job site by simply entering in the proper numbers.

In *Programming the TRS-80 Pocket Computer*, Spencer describes how the machine works, the functions of its keys, and provides examples of the TRS-80 PC in operation. He keeps his examples practical and simple as he discusses the BASIC programming needed to run the computer. The book also contains large drawings of the TRS-80's display which shows various stages of almost every problem.

Unclouding the operating system confusion

INSIDE CP/M—A GUIDE FOR USERS AND PROGRAMMERS WITH CP/M86 AND MP/M2

DAVID CORTESI
HOLT, RINEHART AND WINSTON
NEW YORK, NY
570 pp., \$22.95

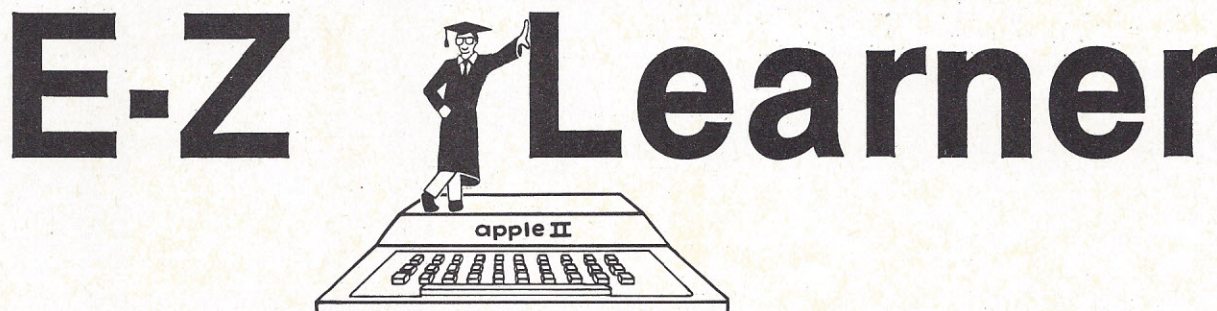
David Cortesi's detailed, understandable book is designed for the experienced computer programmer and user, as well as the novice. *Inside CP/M* is a combination

textbook and cookbook that examines the building blocks of personal computers—their hardware, software and how they use the CP/M operating systems. It is also a fact-filled reference book that answers complex questions about the special operations of CP/M.

Despite its title, *Inside CP/M—A Guide for Users and Programmers*, the book will not teach readers how to program; instead, it details the use of the CP/M operating system as an integral part of a computer system. Specifically, the book stresses how CP/M works, what it can and cannot do and, most important, how readers can avoid or correct errors and problems.

The book is written in the polished

Go on, bring a nice teacher to your Apple™ . . .



E-Z Learner—a menu-driven program, creates, stores and reviews questions and answers on the subject of your choice. Edit the questions and answers, update, merge or transfer however you wish.

Strain Your Brain

E-Z Learner is ideal for learning large amounts of information. Whatever you are studying customize E-Z Learner to your needs. Different subjects can be stored on a separate files, reviewed individually or merged for major exam review. Missed questions will be repeated at the end of the program until you get them right.

Tricky! Tricky!

Challenge yourself. Have E-Z Learner throw questions

randomly or give the answers to which you must supply the questions. Will E-Z Learner be outsmarted? By encouraging quick thinking, E-Z Learner ensures that the answers you seek are truly learned, not momentarily memorized.

Take a Break

E-Z Learner's "bookmark" allows you to interrupt your study then pick up exactly where you left off. Use E-Z Learner for intensive exams or for occasional mind refreshing. Whenever real learning is important, knowledge is at your fingertips with E-Z Learner. Contact your Apple dealer.

Simply the best . . .

Silicon Valley Systems

Silicon Valley Systems Inc. 1625 El Camino Real #4 Belmont, CA 94002 415-593-4344

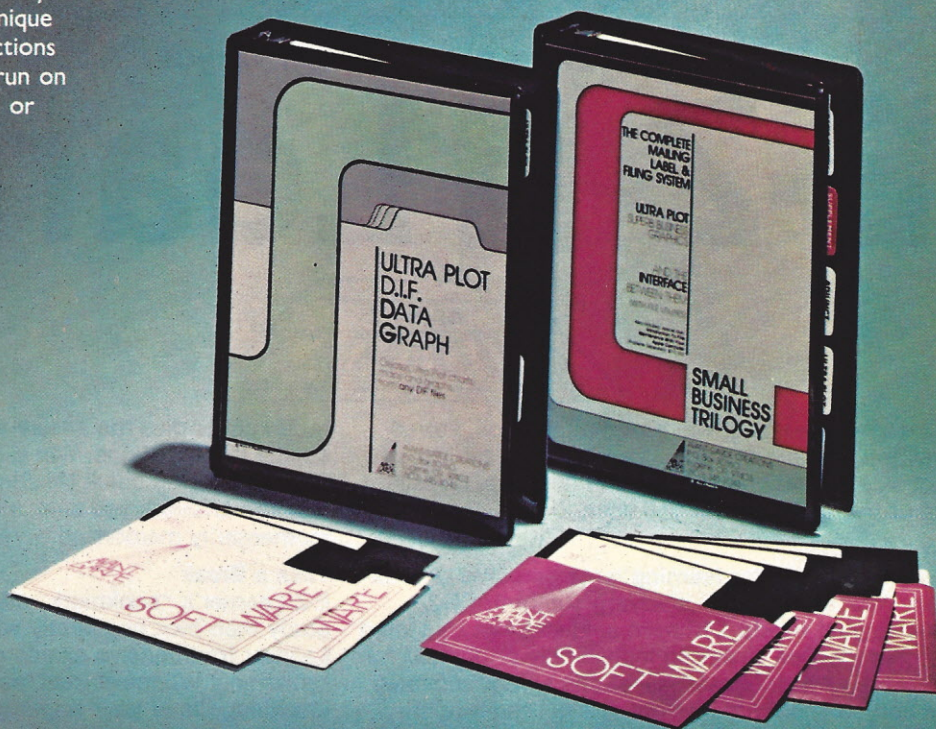
ILLUMINATE YOUR BUSINESS WORLD!

Avant-Garde Creations' business software really shines, with useful programs that can shed some helpful light on your business problems.

ULTRA PLOT/DIF/DATA GRAPH generates all standard business graphics including scatter, line, bar and stacked bar graphs, pie charts and even unique U.S. map charts! Data can be entered manually or read from any of your existing DIF files. The 3 disks and extensive manual retail for \$99.00

THE SMALL BUSINESS TRILOGY includes our dynamic Complete Mailing Label and Filing System, Ultra Plot and an Interface (with utilities) between them. The Mailing System does range sorts, character sorts and can sort 9 fields at once. It can generate formatted reports and even print labels from 1 to 4 across and make duplicates. It can also be used as a data base for Ultra Plot. The 8 disks and 5-part manual retail for only \$175.00. Available with DIF option for \$199.00.

Both systems are completely menu driven and include our unique "How To Try Out" sections for easy preview. Both run on Apple II Plus 48K with 1 or 2 disk drives. Available soon for the Apple III.



AVANT-GARDE CREATIONS

P.O. BOX 30160 • EUGENE, OR 97403 • (503) 345-3043
BUSINESS, EDUCATION, UTILITY AND ENTERTAINMENT SOFTWARE

CIRCLE 70

BOOK REVIEWS

style of a professional who thoroughly understands his subject and the innermost workings of the minds of programmers for whom he writes: "Programming is both an intellectual challenge and an act of personal domination over the machine. However, programmers, like bureaucrats, are always subject to the temptation to confuse means with ends. In their fascination with the intricate puzzle of machine and language, they are apt to forget the people who will actually use the program."

While the entire book will interest programmers and users, its second half alone is well worth the price of the book. It is designed to meet the needs of programmers and users on a daily basis, with page tabs that allow

for almost instant access to any subject. It lists the CP/M commands and functions in alphabetical order, describing the syntax and operations of each.

Unveiling the secrets of the personal computer

AN INTRODUCTION TO MICROCOMPUTERS—VOLUME O, THE BEGINNER'S BOOK

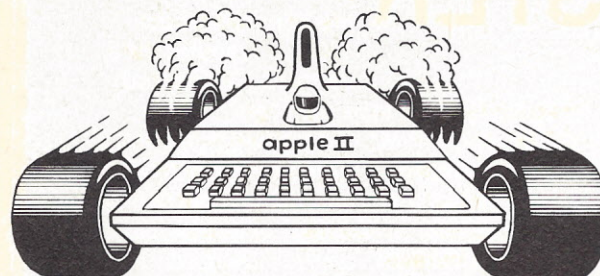
ADAM OSBORNE AND DAVID BUNNELL
OSBORNE/MCGRAW HILL
233 pp., \$12.95

An *Introduction to Microcomputers* is one of those rare

introductory books that will interest junior high-school students, college professors and business executives alike. The authors present their material clearly and accurately, and provide dozens of diagrams that superbly complement and amplify the brilliant text. In short, Adam Osborne and David Bunnell have written an outstanding and informative book.

The book concentrates on the practical information that beginners need to know before using or purchasing personal computers. It explains the various components and functions of these machines, including peripherals, printers and disk drives. *An Introduction to Microcomputers* also includes an extensive primer on

Speed up your Apple™ without changing the engine...



Turbocharger

Speed up DOS to a factor of five!

Turbocharger allows most programs to load in under two seconds. Turbocharger speeds up DOS commands:

- BLOAD
- BRUN
- LOAD
- RUN

Turbocharger automatically date stamps your files and has a built in copy program. Many other useful utilities are included showing you how to use the Turbocharger.

NO modifications to hardware or disk format needed!

That's right—more speed with no engine changes. No Apple user should be without the Turbocharger. The simplicity of use will surprise you. All you need is standard Apple DOS 3.3. If you want to lay down the rubber without laying down the dollars see your Apple Dealer for the Turbocharger.

Simply the best...

Silicon Valley Systems

Silicon Valley Systems Inc. 1625 El Camino Real #4 Belmont, CA 94002 415-593-4344



There's something new under the sun...

Microcomputer **Reader's** software from **Digest**

Though our software is new, you know our name and our reputation for publishing excellence. The publication of software is a natural extension of our commitment to bringing information and entertainment to people around the world. So when you buy software from Reader's Digest, you know you'll be getting the best in clearly documented, truly user-friendly software from one of the most trusted names in publishing.

Look for software from
Reader's Digest at
your software dealer.

Reader's Digest Services, Inc.
Microcomputer Software Division
Pleasantville, NY 10570

CIRCLE 73

WINCHESTER BACKUP

Back-up your Winchester with the new file oriented Model 150. . . Transfer data up to 13.4 formatted

megabytes to a tape cartridge. . . Use CP/M* and MP/M* compatible software, Drivers included. . . Just plug the new Model 150 into any S-100 compatible computer system. . . Contact us today for complete details!

**** Qantex**

Division of North Atlantic, 60 Plant Avenue,
Hauppauge, NY 11788, (516) 582-6060
Toll Free (800) 645-5292

*Registered Trademark of Digital Research

**Registered Trademark of North Atlantic Industries, Inc.



BOOK REVIEWS

BY PAUL HODGE

programming, binary numbers, logic operators and the technical principles behind personal-computer operations.

In addition, the authors have included a detailed chapter on how to choose the right personal computer for the reader's needs, and sum it up with this advice: "Before you buy microcomputer, you must know exactly what you want it to do both now and in the future. Then shop for machine that will accomplish the tasks you need."

Play out your financial planning with paperless spreadsheets

VISICALC HOME AND OFFICE COMPANION

DAVID M. CASTLEWITZ,
LAWRENCE J. CHIAUSKY &
PATRICIA KRONBERG
OSBORNE/MCGRAW-HILL
HAYWARD, CA
181 pp., \$15.99

The development of the VisiCalc spreadsheet programs has enabled personal computers to become truly functional and adaptable business tools. According to David Castlewitz et al, these programs have made working with pencils, paper and even calculators "old fashioned because, "With VisiCalc the paper, your computer display, the pencils your cursor and keyboard, and the calculator is your personal computer."

The *VisiCalc Home and Office Companion* is a collection of 50 different VisiCalc spreadsheet programs for a variety of business and personal financial applications. They have been written and tested



GREAT NEWS FOR EVERYONE WITH A PERSONAL COMPUTER AND SEVEN NUBIAN GOATS.

The High Performance Printer That Delivers Hard Copy At 200 cps.

If you think taking goats' milk to the expanding, demanding gourmet market is duck soup, think again. It takes hundreds of lines of code, dozens of program listings and hours of output review before all the needed reports are dialed in right.

That's why Okidata's Microline 84 is such great news. It gives you data processing and word processing. Fast. It

prints data at 200 cps. And it delivers high resolution, letter quality printing plus graphics at 50 cps. Condensed or expanded fonts, superscripts, subscripts and proportional spacing, all standard. For the linguists among us, the 84 handles down line loadable character sets.

The 84 is the fastest member of the Microline series of printers by Okidata. Each of them is built to last and last, right down to the print head which is guaranteed for a full year. And each of them comes with a price

tag that won't, if you'll pardon the expression, get your goat: from \$449 to \$1,495 suggested retail.

For more great news about the Microline 84 and all the Okidata printers, see your computer dealer or call 1-800-OKIDATA. Okidata, Mt. Laurel, NJ 08054.

OKIDATA

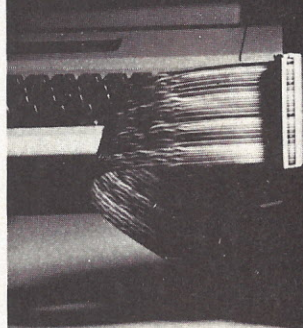
A subsidiary of Oki Electric Industry Company Ltd.

Okidata printers are compatible with Apple, IBM, Tandy, Xerox, and almost every other personal computer you can name.

CIRCLE 77

October 1982 PERSONAL COMPUTING 163

Still Searching?



THE
BIBLE

What Does
The Bible
Say?
And Where?

Now you can use computer technology to search the Bible on any subject. With THE WORD processor (including a disk copy of the complete KJV Bible text) you can create indexes on keywords. Or phrases. Even on concepts.

A full spectrum of text search functions allows detailed analysis for the real student of the Bible.

Print or display selected verses and/or references for personal study or Bible classes. Build your own computerized library of research material.

THE WORD
processor
\$159.95*

Bible Research Systems • 8804 Wildridge Drive • Austin, Texas 78759 • (512) 346-2181
or call Your Local Dealer

Requires 48K, 1 disk drive, APPLE or TRS-80
APPLE is a trademark of APPLE Computer, Inc.

* Plus \$2.50 postage/handling
TRS-80 is a trademark of Tandy Corp.

CIRCLE 39

INVESTMENT ANALYSIS FROM CENTENNIAL

STOCK-FOCUS

Find out how low is low and how high is high. Using capital structure and performance data, Stock-focus objectively calculates the underlying value of a stock. The system was first developed by the management science department of a major money center bank, and is now in use by investment advisors, trust companies and brokerage houses. On your screen, Stock-focus will plot an estimate of lowest value, highest value and the current price. You then decide what to buy, sell or hold.

THE FOCUS TECHNIQUE

FOCUS is CENTENNIAL SOFTWARE's new approach to Program Architecture, providing a natural interaction between microcomputers and users. It provides worksheet style input screens, free access to all program segments, and the ability to combine individual results files for portfolio analysis. You also receive a usable reference manual, menu helps, a program glossary, multiple report formats and spooling. With our FOCUS technique even the most complex programs are versatile and easy to use.

REAL-FOCUS

Exhaustively analyze potential real estate investments using the Wharton School's approach to real estate analysis. In minutes you can project profit, costs, and IRR for any project over a 10 year period. Real-focus accounts for amortization, debt, income, operating expenses, taxes, depreciation, and cash flows for both after-tax holding and the results of sale. With Real-focus you can analyze any potential investment from a single building project to a complex time-phased planned unit development.

COMPUTER	MEMORY-K	REAL-FOCUS	STOCK-FOCUS
IBM PC	64	\$179.00	\$189.00
Apple (plus) II	48	149.00	159.00
TRS 80 I	48	149.00	159.00
TRS 80 II	64	179.00	189.00
TRS 80 III	48	149.00	159.00

IBM is a trademark of IBM. Apple is a trademark of Apple Computer Corp. TRS-80 is a trademark of Tandy Corporation. All programs in Disk Basic



CENTENNIAL Software

410 17TH ST. SUITE 1375
DENVER, CO 80202
(303) 595-9193

ORDER NOW! FILL IN OR CALL 800-525-2003 (Toll Free)

PROGRAM NAME _____ COMPUTER _____ MEMORY _____
NAME _____ PHONE # _____
ADDRESS _____
CARD ACCOUNT # _____ EXP. DATE _____
☐ VISA ☐ master charge

CIRCLE 83


BOOK REVIEWS

several personal computers including the Apple, the TRS-80, the IBM PC, and the Commodore PET and CBM. In most cases readers just key in the programs as they are written in the book, substituting their own data in place of the sample data. The book also includes a printout of each program, highlighting the values that must be provided by the user.

Among the most interesting programs are the Stock Portfolio, The Planned Expense Analysis, and the Home Inventory and Personal Possessions Evaluator. The Stock Portfolio program enables investors to keep track of everything they need to know about the performance of their investments. It monitors the number of shares, purchase price, current price, dividends per share, yields, and, of course, the total market value of the portfolio.

The Planned Expense Analysis program will interest managers who need to compare month-to-month changes in the expenses of their various departments. It calculates the differences between each month's planned and actual expenses, showing both the dollar and percentage changes in the actual expenses from month to month.

The Home Inventory and Personal Possessions Evaluator is one of several programs designed for home financial use. It is used to itemize and evaluate personal possessions (such as your personal computer) for insurance coverage, and it evaluates claims for losses due to fire or theft. The program lists each item's original cost, resale value according to straight line depreciation, and the replacement value based on the local inflation rate.

The *VisiCalc Home and Office Companion* is easy to use, and its programs will interest most people who have or use personal computers for business purposes. The programs are well-written, making the book a worthwhile addition to the reader's personal computer library. 



CRUSH THE EMPIRE IN MEGAWARS

ENLIST

MegaWars, a real-time space battle between the forces of the Colonists and the Kryon Empire. Join an intergalactic shootout with up to eight starship commanders transmitting orders from the keyboard cockpits of their craft anywhere in the U.S.A.

THE ULTIMATE COMPUTER CONFLICT

Attacking, evading, scanning, communicating. That's MegaWars. Easy to learn but difficult to master. That's why CompuServe will give one free hour to every MegaWars player entering a game before December 31, 1982.

Call toll free
800-848-8990.

You'll receive the illustrated guide to CompuServe, America's most comprehensive Videotex service, plus the MegaWars Commanders Briefing.

CompuServe

5000 Arlington Centre Blvd.
Columbus, Ohio 43220
800-848-8990

Win, Lose Or Draw, The Money's In The Bank

Now you can hone your skills and play seven-hand draw poker before the real game begins—and without risking your nest egg

by Thomas Throop

Ever wish you could practice your poker skills before the weekly poker night? Ever want to bet the house limit without losing your shirt in the process? Now you can satisfy your card playing urges with Dynacomp's (Rochester, N.Y.) Poker Party—and you don't have to clean up the cigar butts and beer cans when the game is over.

This program is actually a computer simulation of a seven-player draw-poker game. You are the primary player and the computer represents the other six people. The objective of this game is the same as in an actual poker game—to win all of the money. The computer players know only the information which would be available to each player in an actual game. Most of the players play quite well, usually betting according to a table of odds, but with variations in degrees of bluffing.

The card deck contains the standard 52 cards plus a joker called the "bug." The joker may be used as a restricted wild card which you define at the beginning of the game, as an ace, or to fill out a straight or a flush. The joker could thus be used with two pairs to create a full house if and only if one of the pairs consists of aces.

Each player starts with \$100 worth of chips. The ante for each deal begins at \$1 and increases \$1 with each deal for which no one opens. The basic bet and each raise is \$5 before the draw, and these are increased by \$1 with each deal for which no one opens. After the draw, the basic bet and amount of each raise are doubled. Three rounds of betting are permitted before the draw and three after the draw. Occasionally, the house will debit a player \$2 for pretzels and beer.


In the three games I played with the program my six opponents were Joyce, Oscar, Ruth, John, Bev and Kathy. In the first game Bev was the first to lose all of her money, followed by Joyce. When one of your opponents runs out of money, he leaves the game. When

you run out of money, the game is over and the program must be restarted to play another game. After 27 hands, I, too, lost all of my money and the program said, "Thanks for coming over, Tom."

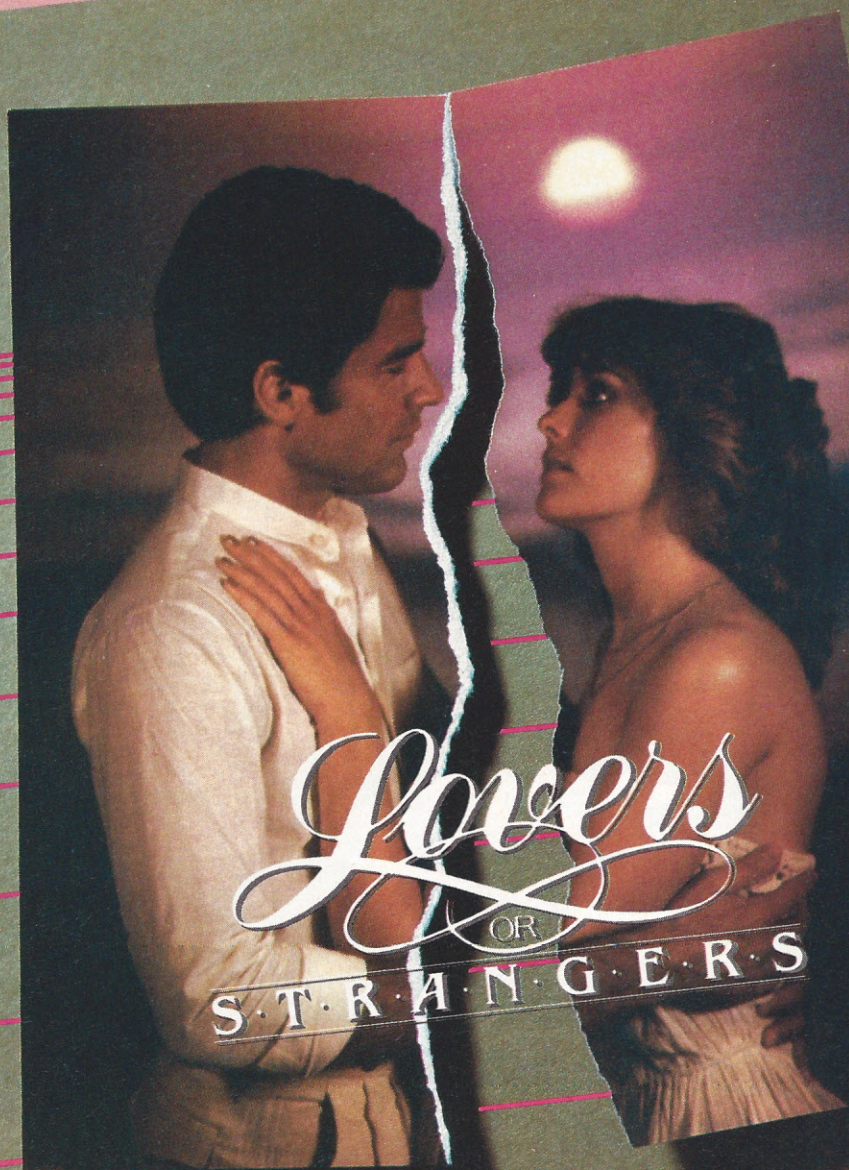
In the second game I was \$94 ahead after 15 hands when I hit a key that the program did not understand; this ended the game. There appears to be no restart procedure to continue the same game if you encounter a keyboard-entry problem, and the program's documentation mentions no such restart procedure.

After the third game I was beginning to draw certain conclusions about the ability and betting tendencies of the specific players, just as you would in an actual poker game. After a few hands I based my betting partially on which opponents were still playing any particular hand. Thus, the player is confronted with a realistic learning situation, which I think makes the product most interesting. I think the game could have been made even more interesting, however, if the betting amounts were not fixed, but rather allowed to be, for instance, \$5, \$10 or \$20 when the basic bet is \$5.

The program, at least for the TRS-80 Microcomputer Model I, has some other weaknesses which detract from the play. First, sometimes an opponent's hand will scroll off the screen after you "call" him. Second, you are not shown your drawn cards until you have made your bet. If you were shown them immediately, you could be thinking of your betting strategy while the other players are betting. Third, a poker "call" (when you decide to bet an amount equal to the last bet) is termed "sticking," which is a word used in the game of blackjack. Fourth, it would be helpful to know the size of the pot at all times during the betting, and have the program sort your cards by suit and rank.

Poker Party runs on Apple, Atari, North Star, Commodore and Radio Shack personal computers. For most machines, the product requires 16k of memory, but the Apple version requires 32k and the Atari version 24k. The price for the cassette program is \$19.95; the disk program is \$23.95. 

Maryland-based Thomas Throop is a free-lance games writer who has been working with computers since the days of the Univac 1.



Were you made for each other? Are the two of you destined for romance? Spend an evening with LOVERS OR STRANGERS, and find out. LOVERS OR STRANGERS can tell how compatible you are in love, sex, money, work, play and more. It's fun...it's serious...it's romantic...it's thought-provoking...it will keep you up nights.

LOVERS OR STRANGERS is available at your local dealer or direct from
Alpine Software, 2120-E Academy Circle, Colorado Springs, CO 80909 (303) 591-9874

Only \$ 29.95. Add \$.100 for shipping/handling. VISA, Mastercard, checks, COD accepted.
Colorado residents add 3% sales tax. Requires Apple II Plus, 48K, DOS 3.3, and a willing partner.

Apple II Plus is a registered trademark of Apple Computers, Inc.

CIRCLE 78



"The best choice I made in buying a computer? Buying from a Byte Shop.®"

"My Byte Shop gave me a good price, and a good product."

"More important, the people at the Byte Shop helped me find the solution that's right for me. And got me using the system quickly and easily."

"I had hoped computers would be exciting. But I had no idea it would all be so easy."

Buying a computer *can* be a simple matter. Whether you're looking for a business system or a personal system, your Byte Shop can help connect *you* with the things a computer can *do*.

We're not here to sell you a particular product. We're here to connect you with the *benefits* of computing. And those benefits are outstanding for your work, your job, your business, your home, your family, or your day.

®: Registered trademarks of Byte Industries
TM: Trademark of Byte Industries.

We stock a broad range of computers, software, and all the other products you need for computing solutions. Your Byte Shop retailer is a friendly, informed source of information and top name products at bottom line prices.

We're the Affordable Computer Store.® Before you make a choice in your computer purchase, check out a Byte Shop. We just might make your choice a whole lot simpler.

Call 415-783-8272 for the Byte Shop location nearest you.



Connecting you with what a computer can do.™

LETTERS

(continued from page 8)

a classroom teacher and administrator behind me, I found the article by David Grady, "A Hard Look at the World of Educational Computing" on page 40 of the August issue, most intriguing. I, in turn, would like to take a "hard look" at the major points made by Mr. Grady in that article.

Mr. Grady asserts that the real crisis facing schools is not a software shortfall but a hardware crunch, accompanied by a misconception about how computers can help children learn. I must object, first, to his identification of the "real crisis." There is a crisis, but it has nothing to do with software shortfalls or hardware crunches. Rather, it stems from a present and growing lack of public confidence in the effectiveness of our public schools. Falling test scores on one hand, and an apparent growing disciplinary disorder on the other, are frequently cited in the media as the cause of failing public confidence. The result, as Mr. Grady indicates, is a rapid reduction in financial support for schools. No doubt the faltering economy has a great deal to do with this, but lack of public support for schools has made cutting school budgets a popular political activity.

Is it possible to employ personal computers to assist schools in overcoming this negative image? I am convinced that the answer is an emphatic yes! In explaining this answer, however, I must return to another assertion of Mr. Grady's that there is a misconception (presumably on the part of schools and teachers) as to how computers can help children learn. The misconception, I submit, is not harbored by schools and teachers, but by people who advocate the use of computers in schools, in accordance with the description provided by Mr. Grady.

As I understand it, Mr. Grady's recommendation is that schools be flooded with personal computers so that, presumably, each child will have an almost unlimited opportunity to explore the world which lies behind the keyboard, with the probable result that each will ultimately discover for himself the knowledge and skills for which schools are responsible. If Mr. Grady has followed in detail, as I have done, the innovations of the '60s and early '70s, most of which attempted to achieve

(continued on page 172)



I See a Brilliant Future

for the APPLE II with the
Ren Tec RGB Color Monitor Interface
Now your Apple can have RGB
Color—the sharpest image
available in technology today.

plus:

- ★ Ren Tec ES Interface\$295.
for Apple and most other
microcomputers
Converts Olympia Typewriter to
letter-quality printer
- ★ GRAPPLER\$175.

- ★ Interfaces to NEC and other RGB
monitors
- ★ Compatible with 40 and 80 column
boards
- ★ Fully supports semi-graphic and
full-graphic modes
- ★ Plugs into I/O slot

**APPLE/RGB Color
Monitor Interface ..\$225.**

OTHER REN TEC PERIPHERALS:

IBM

- ★ IBM/Diablo Printer Interface ..\$160.
- ★ IBM/Spinwriter Interface 160.
- ★ IBM/RGB Color Monitor Cable 36.

Authorized Distributor for:
NEC, Olympia, Eagle, Konan

DEALER INQUIRIES WELCOME

NEC PC-8000

- ★ Wedge\$595.
Additional Peripheral and Memory
Capabilities
- ★ RGB Color T.V. Converter 149.
- ★ RS-232 Interface Card 159.
- ★ 32K Memory Board 199.
- ★ Speech Synthesizer 295.

RENAISSANCE TECHNOLOGY CORPORATION

1070A SHARY CIRCLE, CONCORD, CA 94518 • (415) 676-5757

CIRCLE 75



NEW, FREE COMPUTER FORMS CATALOG!

Carbonless checks, invoices and statements

- ★ Standard formats...plus Custom Design Service!
- ★ Small quantities (as low as 500)...plus money-saving prices!
- ★ Super-fast service (shipped 5 days after receipt of order!)

SEND COUPON...OR CALL TOLL-FREE: 1-800-328-9697



FREE
COLOR
CATALOG

To: Delmart Company, Division of Deluxe Check
Printers, Inc., 530 N. Wheeler St.,
P.O. Box 43495, St. Paul, MN 55164-0495

☐ **YES**, please send free color catalog!

Name _____ Title _____
Firm _____
Street _____ Phone (____) _____
City _____ State _____ Zip _____

CIRCLE 57

The Panasonic portable computer We've improved the way



THE **Link** by Panasonic.™

It will improve the way you solve problems. And the solutions come from the portable computing power you have at your fingertips. You can take it with you on planes, cars, boats, anywhere, because it fits into a suitcase. You can be more cost effective in the field, because you'll have access to more information for making on-the-spot decisions. You'll have the incredible advantage of being able to telecommunicate from anywhere you are. It gives you a whole new world of computing. Portable computing.

Software Solutions — Now there's an exciting new software system for the 6502 microprocessor that gives you more solutions to your problems.

The popular language software for the portable computer includes Extended Basic Compiler/Interpreter, SnapFORTH and Microsoft Basic.®

The Panasonic portable computer also has a wide range of specific software programs for your specific problems, such as:

The Scientific Calculator — An incredibly powerful tool that solves mathematical problems for the scientist, engineer, and professional wherever they go.

Portabudget — It's your portable personal financial manager. It gives you up-to-the-minute personal control. It allows you to be your own record keeper, savings advisor, accountant, bill manager, credit and charge account guide, investment counselor, portfolio keeper, and tax assistant. Overall, it helps plan your personal financial life, portably.

Portacalc — Gives you the portability and the flexibility to automatically analyze numerical problems wherever and whenever they arise. You can assess "what if" alternative business problems, comprehend key variables in business, and dynamically analyze problems on engineering projects.

Portawriter — It allows you to write, edit, and format information. And, you can telecommunicate the information from wherever you are. Whether you're in the boardroom, hotel room, or even on a golf course, Portawriter gives you full editing and formatting capability for notes, reports, letters, news copy, tables, lists, forms, orders, you name it.

Portalog — It is an easy, precise tool for time-billing professionals without a minute to lose. Whether you're on the road or in the office, you can log time, compile bills, generate billing reports, and track the work of your highly paid employees. Portalog gives you improved timekeeping productivity.

Telecomputing 2™ — It lets you telecommunicate with your data base. You can establish communications between headquarters and field forces. Exchange files and programs between remote stations. Access timesharing services and store data in a large computer's mass storage. You can also upload and download program data.

with a wide range of new software. you solve problems.

Portaflex — A master program that allows you to create solutions for applications, such as:

- ☐ *Inventory Control* — Analysis and control of inventory while you're on the job.
- ☐ *Order Entry* — A customized system for any sales order entry. It offers you productivity, and the advantage of faster order entry.
- ☐ *Field Service* — Retrieve, diagnose, and analyze your field service data wherever you are in the field.
- ☐ *Auditing and Accounting* — Custom auditing and accounting, anywhere you are in the field.
- ☐ *Estimating* — Versatility for flexible bidding and estimating at your job site.

Software Development Tools for the Customizer — Create your own custom programs and burn them into your EPROM so your program is recorded in nonvolatile form.

Simply take a desk top microcomputer*, insert the software development discs, create your own program, de-bug that program, compile the program, then "burn-in" your problem-solving EPROM.

*Presently offered for Apple II Plus.

Hardware Specifications —

The Panasonic portable computer offers 6502 microprocessor (1 MHz) technology.

- ☐ It offers 4K or 8K internal nonvolatile RAM
- ☐ 48K internal ROM
- ☐ Built-in Ni-Cad rechargeable battery pack
- ☐ External AC adapter/recharger
- ☐ 26-character liquid crystal display
- ☐ 65-key completely redefinable keyboard

Introducing Peripherals for Additional Solutions —

Modular peripherals let you customize your system.

- ☐ Multiple RS-232C serial interfaces
- ☐ Asynchronous modem with cassette interface (110 or 300 baud)
- ☐ 40-character microprinter (thermal dot matrix printing)
- ☐ 8K or 16K RAM memory expansion packs
- ☐ X-Y, four-color plotter (up to 80 characters per line)
- ☐ TV adapter (32 characters X 16 lines with color and graphics)

The Panasonic portable computer. It's improved the way you solve problems. Because we believe its portable modules and multiple software applications can vastly improve your productivity. And that can be an important solution to your profit problems.

The portable computer from Panasonic. We've improved the way you solve problems.

THE Link by Panasonic. It's changing the way the world uses computers.



PSC-S

Please send me more information.

Dealer Inquiries Invited

Panasonic Company, Hand-Held Computers
One Panasonic Way, Secaucus, New Jersey 07094

Name (PLEASE PRINT) _____

Title & Company _____

Type of Business _____

Address _____

City _____ State _____ Zip _____

Phone Number () _____

Panasonic®
just slightly ahead of our time.

Quick Tax

has the finest
software
I've ever seen
for the
**Accounting
and Tax
Professional.**

The programs are so well designed and supported, we had no start-up problems."—Ronald Braun, C.P.A.

1040 TAX PROGRAM \$995

- ALL MAJOR FORMS & SCHEDS.
- PRINTS ON IRS FORMS, MULTI-PART FORMS, OR OVERLAYS.
- INDIVIDUAL OR BATCH PROCESSING.
- AUTOMATIC CARRY-FORWARD OF PRIOR YEAR DATA.
- DIAGNOSTIC REPORTS.
- LETTER OF INSTRUCTION.
- AUTOMATIC CLIENT BILLING.
- MAILING LISTS/LABELS & ENVELOPES.
- UNLIMITED SUPPORTING SCHEDULES.

Simple and easy to use!

PLUS:
PROFORMA/TAX ORGANIZER
STATE MODULES AVAILABLE
TAX PLANNING
DEPRECIATION SCHEDULE

ALSO AVAILABLE:
GENERAL LEDGER
CLIENT WRITE-UP
AFTER THE FACT PAYROLL
AMORTIZATION SCHEDULE
TIME AND BILLING

ALL QUICK TAX PROGRAMS COME WITH
ONE YEAR WARRANTY & SUPPORT.

See your nearest computer dealer.
Or, call or write for more information.

Quick-Tax Software is available for Xerox 820,
IBM, PC, Radio Shack, DEC, Vector Graphic,
Northstar, and other CP/M based computers.

CP/M is a registered trademark of Digital Research, Inc.

DEALER DISCOUNTS AVAILABLE.

**Quick
Tax Ltd**

319 Clawson St. Dept. PC
S.I., N.Y.C., N.Y. 10306
(212) 351-6143

LETTERS

(continued from page 169)

somewhat similar results using teacher-independent methods, he knows that virtually all of them have been abandoned. Why? As soon as the special support that attended their pilot phases was dropped, falling test scores or other negative results dictated their being phased out.

If the personal computer is to make a significant contribution to school effectiveness, it must be conceived of not as a substitute teacher, but as an aid to the teacher in managing instruction. It can also be used (and is now being used) in providing enrichment for more advanced students and as a tutor for those who tend to lag behind. But its most effective use will be as a management tool, providing the teacher with immediate access to a broad student data base, as a means for rapidly assessing student progress, and in using these data to plan instruction. It may also be usefully employed in tandem with a video disk or cassette recorder in making more effective presentations and in guiding skills development.

Note, please, that none of the uses identified above is based on the assumption that every child need address the keyboard on a regular basis. Nor is the computer viewed as a primary tool of direct instruction. Such an assumption is not likely to prove viable due to a lack of school funds and is, in my opinion, counterproductive to the essential role of the teacher in leading instruction.

Charles M. Proctor, Jr.
SILVER SPRING, MD

Your recent article on educational computing (on page 40 of the August 1982 issue), was an interesting view of the current problems with introducing computers into the American school system. Unfortunately, I feel that many other severe problems were left unquestioned.

The most significant problem facing educators trying to incorporate computers into the school system is diminishing educational budgets. With available funds shrinking at every turn, schools will be hard pressed to improve much beyond the current minimal computerization described by the article.

The American public school system, for all its good intent, is reaching or has reached a limit of sorts. It can barely afford to supply the necessary books for

current learning procedures, and in many different fields, these books can be reused for years and years. This is quite a different situation from that of almost any broad implementation of computers. The cost of purchasing the quantity of computers necessary to produce a computer-literate next generation is astronomical. Furthermore, this cost cannot be amortized as with traditional learning materials, due to the pace of improvements within the computing fields.

Consequently, I must reach the unfortunate conclusion that there is little hope for the future of public education. If "computer literacy" or "computing" is to become as essential as reading, writing and arithmetic, then the privately owned, usually better funded schools will provide a noticeably better learning alternative to the public school system. If enough of the middle- and upper-class families remove their children from the public school system, it is not unthinkable that they will then demand the right to be exempt from school taxation. This will not help the plight of the public schools either. Also, this will further polarize the race and class differences, and coupled with the influx of robotics, create a new, large group of unemployables.

I realize that this may portend a dismal future, but unless these questions are resolved, I foresee no other conclusion.

Gil Kettles
BERKELEY, CA

David Grady's article, "A Hard Look at the World of Educational Computing," on page 40 of the August 1982 issue, hit the nail on the head with a sledgehammer. The accompanying illustration which shows a long line of kids (24 to be exact) waiting to use a single personal computer is worth the proverbial thousand words.

It was looking at lines of kids like those in the illustration, or worse yet, kids who are totally excluded from computer use because they are not "gifted," that led my wife and I to move from public school teaching to private education. We now head the Kids Computer Connection, a users group for youngsters that has a heavy emphasis on programming. We feel that the "genuine computer literacy" Grady talks about should be provided through public schools, but we don't see that happening.

TIME-PROVEN PERFORMANCE



While new printers with impressive specifications are introduced on an almost daily basis, only time will tell the true quality of the product. Over the past 2 years our customers have continued to buy the DS180 printer, not only because of its impressive performance and competitive price, but also because of our outstanding track record for product reliability and customer support.

We have continually improved on the performance of the DS180 by incorporating such enhancements as dot addressable graphics, 6 user-selectable print sizes and a 2000 character buffer. These features coupled with 180 cps printing, parallel and serial interfaces, adjustable tractor feed and over 40 other programmable features, make the DS180 one of the most versatile matrix printers available today.

Before you select your next printer, why not take a look at a time-proven performer—the Datasouth DS180.

The DS180 printer is available nationwide through our network of sales/service distributors.

datasouth computer corporation

P.O. Box 240947: Charlotte, N.C. 28224: 704/523-8500

Tlx: 6843018 DASOU UW

CIRCLE 87

DISCOUNT APPLE® BUSINESS •SOFTWARE•HARDWARE•

•DISCOUNT\$ TO 48%•
•500 + PROGRAMS-CALL•
ACCOUNTING SOFTWARE

	LIST	COST
•B.P.I. G/L-A/R-Payroll (Ea)	\$395	\$279
•Systems-Plus Accounting + II		
G/L-A/R-A/P-Inventory (Ea)	395	259
ALL Four Modules	1250	769
•Continental Software		
G/L-A/R-A/P-Payroll (Ea)	250	159
ALL Four Modules	1000	609
•Broderbund G/L w/Payables	495	315

COMMUNICATIONS SOFTWARE

•SW Data Z-Term Professional*	150	99
ASCII Express II	80	55
•SE Software Data Capture 4.0	65	45
•Microstuf Crosstalk*	195	135

DATA BASE/INFO. MGMT

•Stoneware DB Master	229	145
Utility Paks (Ea)	99	65
•Visicorp VisiFile/VisiCalc (Ea)	250	169
•Ashton-Tate dBASE II*	700	439
Fox/Geller dUTIL*	99	69
Quickcode*	295	219
•DATABASE PACKAGE SPECIAL		
dBASE II* + Quickcode*	995	599
Sorcim Supercalc*	295	189
Micropro Calcstar*	195	105
Software Publishing PFS (New)	125	85

SPECIALIZED SOFTWARE

•HowardSoft Real Estate Anal. II	195	129
•Applied Software Versa Form	389	269

UTILITY SOFTWARE

•Nibbles-Away II (Copy pgm)	70	55
•Sensible Super Disk Copy III	30	22
•Microsoft TASC Compiler	175	115

WORDPROCESSING SOFTWARE

•Micropro Wordstar (Ver 3.01P)*	375	195
Wordstar w/Mail-Merge*	500	259
Spellstar*	200	105
•On-Line Screenwriter II	130	89
•Kensington Format II	375	229
•Artsci Magic Window	100	65
•SoftSys Executive Secretary	250	169
•LJK Letterperfect	150	99

HARDWARE SPECIALS

•Microsoft Softcard w/CP/M	399	215
•Microsoft 16K RAMCARD	195	99
•Videx Videoterm w/Soft-Switch	380	229
Keyboard Enhancer II	149	99
•Kensington SYSTEM SAVER Fan	90	69
•D.C. Hayes Micromodem II	379	259
•Micro-Sci A2 35T Disk Drive	479	329
•N.E.C. 12" Green Hi-Res CRT	285	169

CP/M® HARDWARE SPECIAL

•Microsoft Softcard w/CP/M + 16K RAMCARD*		
•Videx Videoterm 80 col. Card*		
•Videx Softswitch & Inv. Char. Set*		
•Osborne CP/M Users Guide*		

SPECIAL PURCHASE-SAVE

(List \$1003)*SPECIAL \$519*

TECHNICAL HOTLINE

•(213) 410-1986•

•7:30-9am M-F•Consultation available•

ORDER DESK

TO PLACE ORDERS ONLY-CALL...

•(213) 823-0767•

WE PAY FOR YOUR CALL!
ORDERS OVER \$200-Deduct \$3

TERMS: All prices are MAIL-ORDER ONLY and subject to change without notice. Some items are in limited supply/subject to stock availability. No COD orders.

PAYMENT: Cashier's Ck/MO-Bank Transfers accepted-Allow 20 days for personal checks-CA Residents-Add 6% Tax. (LA Co. 6 1/2%)

SHIPPING: Under \$500-Add:\$5 UPS Surface
Over \$500-FREE UPS SURFACE!

MASTERCARD/VISA: Under \$500-Add 3%
Over \$500-Add 2%

* Apple-TM Apple Inc.
* CP/M-TM Digital Research
* Program requires Softcard (CP/M)

•FREDERICK E. DEEG•
and Associates
13234-A FIJI WAY
MARINA DEL REY, CA 90291

LETTERS

If taxpayers and educators could only see the tremendous educational forces that are unleashed when you mix kids with enough computers, the problem would be solved.

Jim Tartaglia

DIRECTOR

KIDS COMPUTER CONNECTION
BARRE, MA

ON THE DEVELOPMENT OF PROPERTY-MANAGEMENT PROGRAMS

I am writing in regard to the article by Margo Downing-Faircloth, "Personal Computing Pays Off for Property Managers," on page 55 of your June issue. My company's software package, The Landlord, is mentioned in the article.

Although the article was good, it gives an incorrect impression concerning available products. Ms. Faircloth makes no distinction between her references to "haphazardly developed" programs and the commercially available products listed later in the article.

I would like to take this opportunity to point out that The Landlord and others mentioned in the article were certainly not haphazardly developed. Our program took in excess of one year to design, program and test. During that time we worked closely with professional property managers and owners. Before the program was made available for sale, it was tested and fine-tuned for six months at a 270-unit development in our area. The owner/manager of the development said that the software was appropriate for its intended application, and a CPA reviewed it to assure that it complied with all standard accounting principles.

While some software companies promote the availability of subscription telephone support, our company prides itself on the fact that our average customer never calls us after purchasing the program. Thus, we have demonstrated that property-management software can be thoroughly documented and tested, and that customer problems can be eliminated when the program is used and understood.

I would also like to mention that the retail price of The Landlord was incorrectly stated in the article. The suggested retail price is \$795.

Arthur S. Nacht

PRESIDENT

MIN MICROCOMPUTER SOFTWARE, INC.

MARIETTA, GA

A harvest of savings from



Apple Tree Electronics

SOFTWARE

APPLE • ATARI • TRS80 • IBM

A full line of software for business, games and education **up to 35% off!**

MOUSE	KIS
VISICORP	STONEWARE
ON LINE	SYNERGISTIC
EDU-WARE	HAYDEN
HOWARD	AND MANY MORE

HARDWARE

AMDEK • HAYES • MICROSOFT

FRANKLIN COMPUTER
SYSTEM

ACE 1000 • \$1,795.00

DISKS

Maxell	Box of 10, 5 1/4", SS-DD	\$35.00
Verbatim	Box of 10, 5 1/4", SS-DD	\$29.00

MONITORS

LE MONITORS	List	Our Price
9" Green	\$189.00	\$159.00
12" Green	\$199.00	\$169.00
ZENITH		
12" Green	\$179.00	\$129.00

Plus a full line of AMDEK Monitors

PRINTERS

PAPER TIGER	List	Our Price
460G	\$1,094.00	\$950.00
560G	\$1,394.00	\$1,250.00
EPSON		
MX 70	\$449.00	\$395.00
MX 80FT	\$745.00	\$595.00
MX 100FT	\$945.00	\$795.00

CALL FOR THIS MONTHS SPECIAL!

1-800-835-2246 EXT. 211

OR

702-459-4114

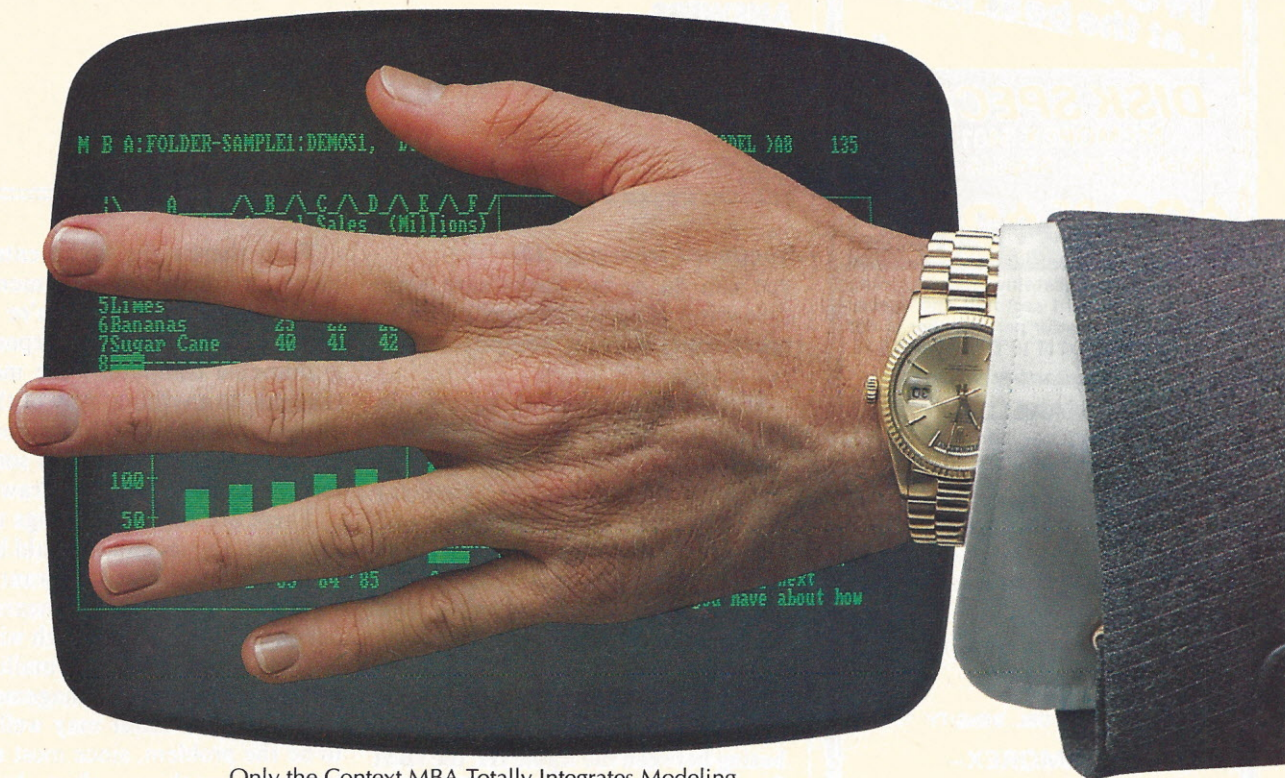


5130 East Charleston Blvd.
Suite 5PC
Las Vegas, Nevada 89122

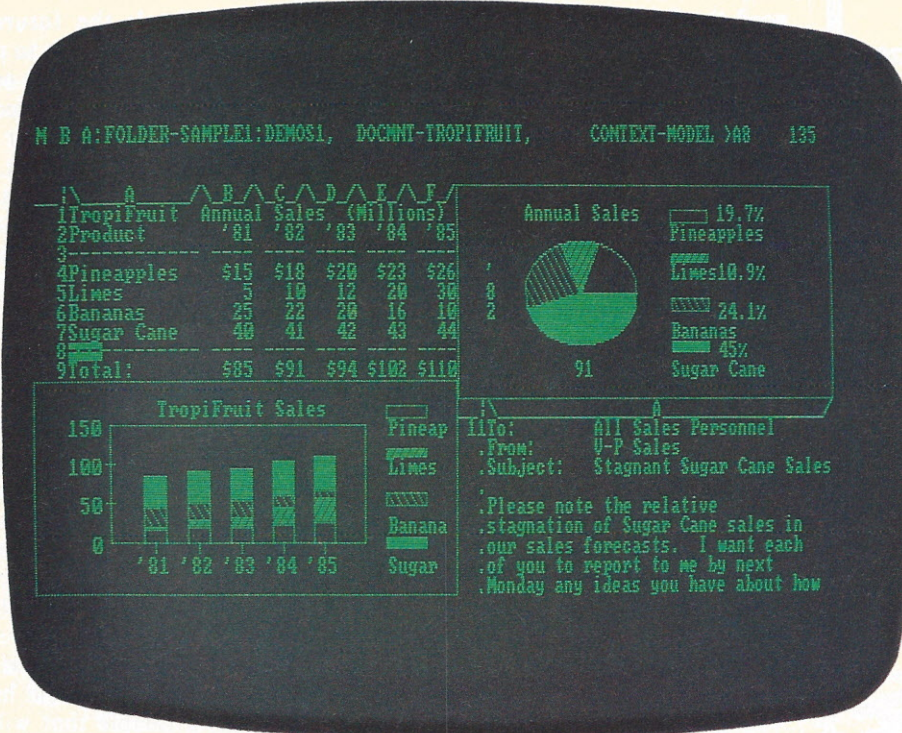


Phone orders welcome. Mail orders may send charge card number (include expiration date), cashiers check, money order or personal check (allow ten business days for personal or company checks to clear). Add \$3.00 for shipping, handling and insurance. Nevada residents add 5.75% sales tax. Please include phone number. All equipment is in factory cartons with manufacturers warranty. Equipment subject to price change and availability. Call or write for price list.

Screen Test:



Only the Context MBA Totally Integrates Modeling,
Word Processing, Database and Graphics in One Program.
_____ TRUE _____ FALSE



Context

Management Software
for Personal Computers

23864 Hawthorne Boulevard
Torrance, CA 90505
(213) 378-8277
Telex 181149 WEST LSA

SOURCE ID TCA 442

The Context MBA turns second generation personal computers like the IBM into powerful management tools. Information entered in any of the C-MBA's four contexts can be used in any other context. Build a model using C-MBA's sophisticated electronic spreadsheet. Switch into database context by pressing three keys to quickly sort your model. When one picture is worth a thousand words (or numbers), a few keystrokes produce one of nine different graphs. Change your

numbers and your graphs automatically update as well.

The word processing context helps you write clear, concise reports. And you can copy in entire tables of numbers from your spreadsheet in seconds.

The Context MBA is far more than four integrated programs. It is a whole new concept in management software.

Personal computers are full of promise. Context makes them deliver. © Copyright 1982 Context Management Systems

★
We Have It!
..at the best prices
★

DISK SPECIAL
MEMOREX 3401 5¼"
SINGLE SIDED, SINGLE DENSITY
1 Box 10 Boxes
\$22.95 ea. \$20.95 ea.

We have a complete inventory including soft sector, hard sector and special formats. Even if your part number is not listed, **WE STOCK IT IF THEY MAKE IT.**

Call for quantity pricing

—MAXELL—

MD1	5¼" SINGLE SIDED	\$32.95
MH1	SINGLE OR DBL. DENSITY	
MD2	5¼" DOUBLE SIDED	\$48.95
MH2	SINGLE OR DBL. DENSITY	
MD1 DD-5¼"	SS, QUAD DENSITY	\$44.95
MD2 DD-5¼"	DS, QUAD DENSITY	\$54.95
FD1	8" SINGLE SIDED	\$43.95
FH1	SINGLE OR DBL. DENSITY	
FD2	8" DOUBLE SIDED	\$56.95
FH2	SINGLE OR DBL. DENSITY	

—MEMOREX—

3481	5¼" SINGLE SIDED	
3483	SINGLE OR DBL. DENSITY	\$28.95
3485	w/HUBRING	
3491	5¼" DOUBLE SIDED	
3493	SINGLE OR DBL. DENSITY	\$36.95
	w/HUBRING	
3504	5¼" SS, QUAD DENSITY	\$37.95
3501	5¼" DS, QUAD DENSITY	\$51.95
3062	8" SINGLE SIDED	\$26.95
3015	SINGLE DENSITY	
3090	8" SNG. SIDE, DBL. DENSITY	\$35.95
3104	8" DBL. SIDE, DBL. DENSITY	\$41.95

—SCOTCH—

744	5¼" SINGLE SIDED, SNG. DENS. w/HUBRING	\$28.95
744D	5¼" SINGLE SIDED, DBL. DENS. w/HUBRING	\$33.95
745	5¼" DOUBLE SIDED, DBL. DENS. w/HUBRING	\$40.95
740	8" SNG. SIDE, SNG. DENSITY	\$29.95
741	8" SNG. SIDE, DBL. DENSITY	\$37.95
743	8" DBL. SIDE, DBL. DENSITY	\$47.95
	HEAD CLEANING KITS, 5¼" OR 8" ...	\$22.95

Minimum shipping charge-\$3.00 Shipped UPS. All offers subject to withdrawal without notice. advertised prices reflect a 2% cash discount (orders prepaid prior to shipment). C.O.D.'s and credit card orders are 2% higher.

 **Mini Micro Mart, Inc.**
Box 3001X Syracuse, N.Y. 13220
315-422-2056
TWX 710-541-0431
WRITE FOR FREE CATALOG

ANSWERS

(continued from page 16)

you can do it, but make sure your typewriter is up to the nonstop high-speed operation a computer will put it to.

If you own an IBM Electronic Typewriter Model 50, 60 or 75, you can install a \$500 Mediamix card (from Mediamix in Los Angeles) that interfaces your typewriter and computer. This is an intelligent device that does a variety of things, including typesetting with the Model 50.

Q: I'm in the process of buying a personal computer, and am debating between the Apple III, the IBM Personal Computer and the Televideo 802. I don't know which one to get. I want to start a home business, but need the flexibility of home management and entertainment on the system. What are the important areas for me to investigate?

A: A plethora of product is available, and although your question mentioned three specific systems, you could be as confused without limiting yourself to those three, or you could eliminate one of them and still not be comfortable.

The problem is the quantity of product vying for attention and the complexity of claims about what each product can do. Sorting out what can be done from what you want to get done isn't easy.

If you want a computer for word processing for a home business, then your choices are almost limitless, because word processing for a home business is probably one of the least demanding applications you could ask of a computer. But you also said you plan to expand into accounting functions with the machine later on. Now the problem becomes trickier. At this point you might decide to get a machine that runs CP/M (Control Program for Microprocessors) because that operating system already has so much business and business-related software written for it.

Then there's the home entertainment and home management you also wanted, so what you're really looking for is a general-purpose programmable computer—the machine that can do anything. Any of the machines you mentioned in your original question will fill the bill to some extent. Any one of them has drawbacks.

There are two basic things to look for. First, the machine should be able to do all the things you want to do right now. This probably means business word processing, which will likely include some kind of mailing-list manager, and home-management capabilities. The latter may well prove to be the problem, since most serious business machines often have no programs for the home written for them.

Second, there's the future. You will almost certainly want to proceed with other applications. The ones you mentioned—the general accounting functions—are available for nearly every computer on the market, except for the very lowest cost models. But in considering expanded applications you have to be careful that the hardware you get can really do the job and can be expanded at not too great a cost.

Expansion means more than just extra memory. You want the machine to provide entertainment. That probably means you should be considering a computer with a color-display capability. And if your home business gets really big (and why not? Apple Computer started as a home business) you'll need other capabilities, like large mass-storage files and a file-backup method. So the machine you choose should have the peripherals available that will allow you to expand as far as you can foresee the need.

Don't think that your analysis now will point out all the hardware you need. It won't. But the machine you get should be able to run what you know you want to do now, expand to handle your foreseeable future appli-

WHY A FORMS PROCESSING DATABASE?

Ever since the introduction of low-cost microcomputers, business professionals have asked for a system that lets office workers use the knowledge they have and the procedures they already understand.

The solution has arrived. VersaForm now provides you and your staff with a natural way to use a computer—a forms processing database system.

THE IDEAL WAY TO USE A COMPUTER

Just about any form in your office can provide a familiar and easily mastered interface to a personal computer. Simply copy a form to the computer screen and you're set.

BUILD YOUR DATABASE WITH ANY OF THESE FORMS

- Bill of Materials
- Client Billing
- Freight Documentation
- Insertion Orders
- Insurance Claims
- Inventory Ledgers
- Invoices
- Job Estimates
- Medical Records
- Personnel Histories
- Project Scheduling
- Purchase Orders

Unlike any other system, VersaForm gets you started on a computer, working the way you're working now... you can even use your existing paper forms.

UNIQUELY DESIGNED TO YOUR OFFICE REQUIREMENTS

Most forms have two parts. The form heading contains information that appears only once on each form, like customer name or project number. The transaction region, below, has a variable number of line item entries which might contain quantities, descriptions, unit costs and extensions. These entries require a system

that does decimal alignment, tax calculations, subtotals, payments, running balances, and allows you to make changes at any time. Ordinary databases simply can't do it.

All these features and more are yours with VersaForm. A spectacularly useful print formatting capability enhances professional forms management. The magic of print formatting is the ability to produce from a single form in your database, several completely different printed forms. For example, from a patient record you can produce a history chart, an insurance claim, a statement and standard dunning notice.

EVERYDAY BUSINESS FORMS DEMAND A TWO-LEVEL RECORD STRUCTURE—

NAME	MICHAEL MOON	DATE	9-21-82
TITLE	PRESIDENT	SLS CODE	100000
FIRM	MICHAEL MOON ASSOCIATES	PROJECT TYPE	ATT AGENCY
ADDRESS	200 SOUTH 8 ST	SITE	2
CITY	CHICAGO, IL	EXP	2000
TERMS	NET 30	AUTH	2225
CHECKED	CH 42100	EXP. DATE	

LN	QTY	STOCK	DESCRIPTION	UNIT	EXTENSION
1	1	010000	APPLE II	\$1200.00	\$1200.00
2	1	010000	COPIES/CONTROLLER	\$800.00	\$800.00
3	1	010000	SIDE II	\$800.00	\$800.00
4	1	010000	IBM MAIN	\$900.00	\$900.00
5	1	010000	IBM PC	\$200.00	\$200.00
6	10	010000	IBM PC/XT	\$100.00	\$1000.00
7	1	010000	IBM PC/XT	\$100.00	\$100.00
				SUBTOTAL	\$5000.00
				TAX	\$17.00
				TOTAL	\$5017.00
				AMOUNT PAID	\$1000.00
				BALANCE	\$4017.00

ONLY VERSAFORM HAS IT.

MANAGEMENT REPORTS IN A HURRY

The real power of a forms processing database is evident with VersaForm's reporting facility. You need only point to the data items within a form you want queried, sorted, counted, subtotalled, and totalled. There's no complicated format to enter—VersaForm automatically produces columnar formats, titled, dated and page numbered.

In just minutes, a detail or summary report is automatically produced. What's more, you can run the report again and again without having to re-enter the instructions.

APPLE II/III IBM PC HARD DISK DATABASE?

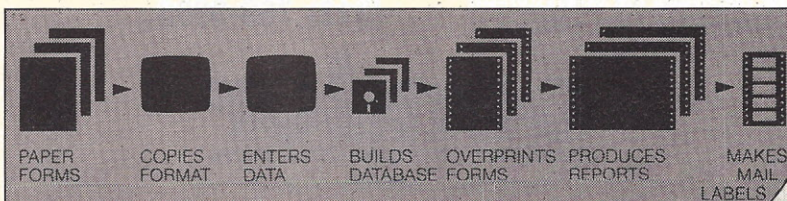
VersaForm supports both floppy and hard disk sub-systems. You can swap data files between different systems through a hard disk-based network. From remote locations data disks can be consolidated into company-wide reports.

OPEN-ENDED SYSTEM.

For special requirements, an optional OEM Pascal Interface provides sophisticated users and software developers with powerful VersaForm tools, allowing direct access to the B-tree indexed database. System integrators can add value by creating templates and writing custom interfaces.

Users say VersaForm is the most powerful and easy to use system around. That's because it's more than just a database; it's a true Business Form Processor.

See VersaForm today at your local computer store.



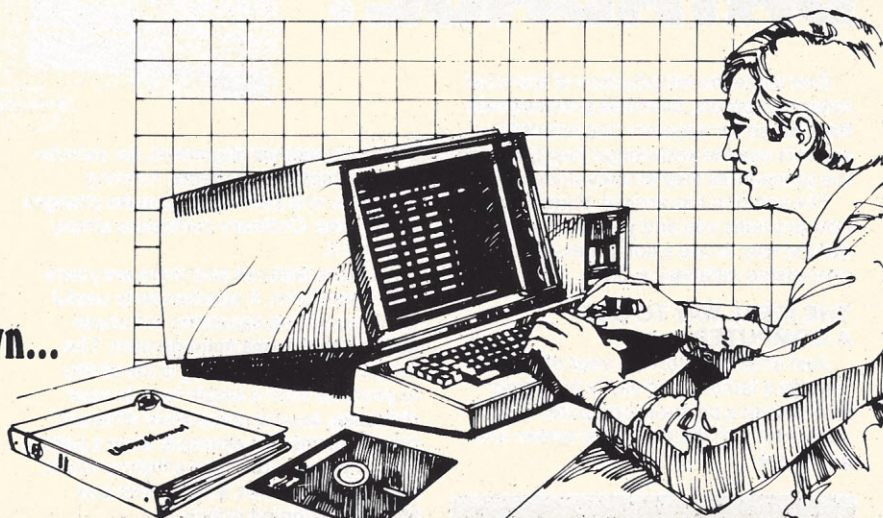
THE ONLY DATABASE THAT COMPLETELY PROCESSES FORMS FROM START TO FINISH.

Dealer and OEM inquiries invited

VersaForm
Business Form Processor
Applied Software Technology
14125 Capri Drive
Los Gatos, CA 95030
408/370-2662

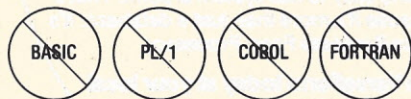
Condor database obsoletes compilers!

Condor relational database management system makes your personal/business computer far simpler to use and much more useful to own... for less money... than other software.



Plain English, no computerese.

Condor relational database management is a complete development and operation system. It eliminates BASIC, PL/1, COBOL, FORTRAN, or other compilers in almost every case. It allows you to deal directly with your information without complex code words. In plain English, it lets you manage your business instead of your data.



Save 90%. Because no complex programming is needed, Condor saves up to 90% of the cost of program writing and testing! You also eliminate costly and time-consuming programmer "talent searches."

State-of-the-art relational format.

Condor makes traditional programming approaches using compilers *obsolete*. Features such as SORT, DEFINE, ENTER, POST AND REORG permit rapid database creation, access, control, monitoring and manipulation. For instance (by using the JOIN command), you can combine the information contained in two large file cabinets—such as "Purchases" and "Labor Cost"—

into a single file—in one operation. To do the same task, ordinary software usually requires substantial reprogramming.

Easiest to learn and use.

Independent evaluators rate Condor *more "user-friendly" than any other personal/business computer database system*. After a brief study of the manual, you start building a database *within 15 or 20 minutes*.

In fact, Condor has allowed many hundreds of first-time users to produce and process their own management reports.



Only \$295 for entry level.

Condor's multi-level modular design provides *full upward compatibility*, up to the most powerful software of its kind in the industry. The entry level Condor I features database file development and management; entry, update,

and posting; inquiry and report writing capabilities; and complete operations aids. And as information needs grow, you can easily upgrade to Condor III for writing highly complex reports and fast-query indexing.



Guaranteed to do more work, more easily for greater savings.

Put Condor to the test. Experience its power and versatility firsthand...how it puts you in direct touch with your data, while eliminating complex programming. You must agree that Condor saves you time, work and money...or return it within 30 days for a complete and prompt refund (at participating dealers only).

Questions? See Condor at your local software dealer, write to P.O. Box 8318, Ann Arbor, MI 48107, or call **(313) 769-3988**.

condor
COMPUTER CORPORATION

P.O. Box 8318, Ann Arbor, MI 48107

**The Industry Standard...Selected by Major Dealers,
Distributors and Manufacturers.**

cations, and have peripherals available that you can use for applications yet unknown.

One final word. Don't be put off automatically because you can't find just the right software package for the application you're looking for. You may have to program one or two. That isn't as terrible as it sounds. If you approach programming the right way, all it takes is your time, which is a cost tradeoff with other variables. While software availability is a big consideration, which we don't downplay, don't assume that a particular computer is out of the running just because software for one of your applications isn't available. You can write the program, and it might be fun to do.

Q: What is magnetic-bubble memory, and how does it work?

A: It's a kind of memory that uses magnetic recording media, as does a magnetic disk or tape. Unlike those media, however, bubble memory has no moving parts.

Researchers discovered magnetic bubbles by accident when they were fooling around with magnetic properties of certain materials. They observed that if garnet were subjected to a strong enough magnetic field, the magnetic domains formed in the garnet contracted so they were no longer contiguous, and assumed a cylindrical shape. Domains are small regions of magnetic similarity in materials. If the north poles of all the magnetic

domains in a bar of iron are lined up in the same direction, the bar is a magnet. The domains generated in the garnet are visible to the eye if the garnet is illuminated under the influence of the magnetic field with light of the proper spectral characteristics. Looking down into the garnet, a semi-precious stone in its natural state that can be grown in the laboratory under controlled conditions to assume desired shapes, the cylindrical domains look like small circles, or bubbles.

Once the domains are separated they can move. Researchers first moved them by hand, pushing them around in the garnet by moving steel needles over the surface of the material. But they soon found another

The Context MBA is available now at:

California

Computer City/Brea 714/996-0800
Computer City/Santa Ana 714/549-7749
ComputerLand/Almaden 408/267-2182
ComputerLand/Belmont 415/595-4232
ComputerLand/Burlingame 415/348-7731
ComputerLand/Fremont 415/794-9311
ComputerLand/Hayward 415/538-8080
ComputerLand/Newport Beach 714/975-0953
ComputerLand/Pasadena 213/448-3205
ComputerLand/Sacramento 916/920-8981
ComputerLand/San Diego 714/560-9912
ComputerLand/San Diego North 714/434-7001
ComputerLand/San Fernando Valley 213/716-7714
ComputerLand/San Francisco-Financial 415/546-1592
ComputerLand/San Francisco-Market Street 415/864-8080
ComputerLand/San Francisco-Van Ness 415/673-6640
ComputerLand/Sonoma 707/528-1775
ComputerLand/South Bay 213/371-7144
ComputerLand/Stockton 209/473-1241
ComputerLand/Thousand Oaks 805/495-3554
ComputerLand/Ventura 805/656-7711
ComputerLand/West Covina 213/960-6351
ComputerLand/West Los Angeles 213/559-3353
Computer Plaza/Santa Barbara 805/687-9391
Gateway Computer Center/Cerritos 213/865-4444
Gateway Computer Center/Huntington Beach 714/895-3931

Connecticut

ComputerLand/Danbury 203/748-2300
ComputerLand/Fairfield 203/255-9252
ComputerLand/Hartford 203/561-1446
ComputerLand/New Haven 203/288-5162
ComputerLand/Stamford 203/964-1224

Delaware

ComputerLand/New Castle County 302/738-9656

Georgia

ComputerLand/Atlanta
ComputerLand/Smyrna 404/577-2449

Illinois

ComputerLand/Arlington Heights 312/870-7500
ComputerLand/Champaign 217/359-0859
ComputerLand/Downers Grove 312/964-7762
ComputerLand/Joliet 815/741-3303
ComputerLand/Lake County 312/949-1300
ComputerLand/Naperville 312/369-3511
ComputerLand/Niles 312/967-1714
ComputerLand/Northbrook 312/272-4703
ComputerLand/Oak Lawn 312/422-8080
ComputerLand/Peoria 309/688-6252

ComputerLand/Schaumburg 312/843-7740
Main Street Computer Co./Decatur 217/429-5505

Indiana

ComputerLand/Merrillville 219/769-8020
The Computer Room/South Bend 219/277-1600
General Microcomputer/South Bend 219/277-4972

Kansas

ComputerLand/Leawood 913/341-5335
ComputerLand/Lawrence 413/841-8611
ComputerLand/Overland Park 913/492-8882
ComputerLand/Topeka 913/267-6530

Maine

ComputerLand/Portland 207/774-1309

Massachusetts

Business Data Systems/Hanover 617/878-7888
ComputerLand/Boston 617/482-6033

Michigan

ComputerLand/Ann Arbor 313/973-7075
ComputerLand/Grosse Pointe 313/772-6540
ComputerLand/Southfield 313/356-8111
Computer Mart/Ann Arbor 313/665-4453
Computer Mart/Flint 313/234-0161
Computer Mart/Kalamazoo 616/329-1000
Computer Mart/Lansing 517/351-1777
Computer Mart/Livonia 313/540-3928
Computer Mart/Tri-Cities 517/790-1360
Computer Mart/Troy 313/649-0910
The Computer Room/Grand Rapids 616/949-2802
The Computer Room/Kalamazoo 616/343-4634

Minnesota

ComputerLand/Bloomington 612/884-1474
ComputerLand/Hopkins 612/933-8822
ComputerLand/Minneapolis 612/333-3151

Missouri

ComputerLand/Gladstone 816/436-3737
ComputerLand/Independence 816/461-6502
ComputerLand/St. Joseph 816/364-4498

New Hampshire

ComputerLand/Nashua 603/889-5238

New Jersey

ComputerLand/Morristown 201/539-4077
ComputerLand/Princeton 609/882-1400

New York

ASD Office Systems/Poughkeepsie 914/473-9400
ComputerLand/Nassau County 516/742-2262
ComputerLand/New York City 212/840-3223
ComputerLand/Suffolk County 516/499-4484
ComputerLand/White Plains 914/328-0144

Datel Systems/New York City 212/921-0110
Future Data 212/964-6666
Morris Decision Systems/New York 212/742-9590

North Carolina

ComputerLand/Durham 919/493-5402

Ohio

Micro Electronics/Columbus 614/481-8041

Oregon

ComputerLand/Multnomah County 503/295-1928
ComputerLand/Salem 503/371-7070
ComputerLand/Portland 503/620-6170

Pennsylvania

ComputerLand/Dresher 215/542-8835
ComputerLand/Harrisburg 717/763-1116
ComputerLand/Lehigh Valley-Allentown 215/776-0202
ComputerLand/Paoli 215/296-0210
ComputerLand/Philadelphia

Texas

ComputerLand/Dallas 214/363-2223
ComputerLand/Fort Worth 817/292-7114
ComputerLand/Houston Bay Area 713/488-8153
ComputerLand/North Dallas 214/235-1285
ComputerLand/Southwest Houston 713/977-0909
ComputerLand/Tyler 214/581-7000
ComputerLand/Houston Westwood 713/270-1200

Utah

Personal Business Computers/Cedar City 801/586-2648
Personal Business Computers/Salt Lake City 801/486-4839

Virginia

ComputerLand/Charlottesville 804/973-5701
ComputerLand/Richmond 804/741-3502
ComputerLand/Tyson's Corner 703/893-0424
ComputerLand/Woodbridge 703/491-4151

Washington

ComputerLand/Bellevue 206/746-2070
ComputerLand/Federal Way 206/838-9363
ComputerLand/Lynnwood 206/774-6993
ComputerLand/Renton 206/271-8585
ComputerLand/Seattle 206/223-1075
ComputerLand/Tacoma 206/383-4951
ComputerLand/Vancouver 206/695-1540

Washington, DC

ComputerLand/Washington, DC 202/835-2200

Wisconsin

ComputerLand/Madison 608/273-2020

Canada

Computer Mart/Windsor 519/966-5757

ANSWERS

means—using electrical signals. That was the real genesis of the useful bubble memory.

Today's bubble memories are made from a garnet with a metal pattern laid down over the surface. When the bubbles form they tend to congregate along the metal pattern. As the pattern is pulsed with electrical current signals, the bubbles advance along the metal pattern. As the bubbles advance they pass under a sensing device that can convert the presence of a bubble into an electrical signal. Then, if circuitry is assembled that "understands" the presence of a bubble as a "1" bit and the absence of a bubble as a "0" bit, the sensing device "reads" digital information as the bubbles pass underneath it.

This is, of course, a very simplified explanation of how the bubbles work, but it's essentially correct.

Permanent magnets are used in production bubble-memory devices to maintain the bubbles. That causes one of the drawbacks—bubble memories are heavy. Permanent magnets are relatively heavy devices. Among other drawbacks, the main one is the large amount of power needed to move the bubbles around, to read the bubbles, and to generate new bubbles. That power requirement is a lot bigger than with other kinds of memory.

The principal advantage of bubble memory is its ability to keep its data when the power is off. Semiconductor memory, the kind used in most every

personal-computing application, can't keep its information recorded in the absence of a power supply. Bubble memory can, because the permanent magnets keep the bubbles sitting where the user left them until the power is turned on again.

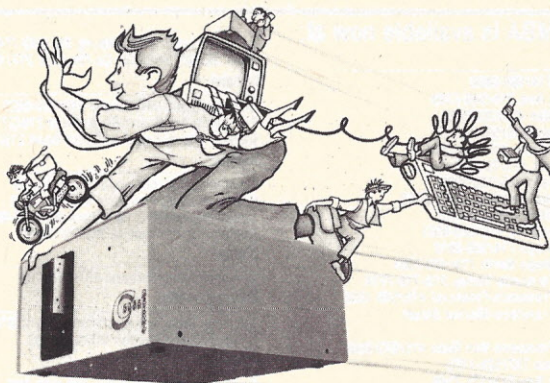
Q: What is so special about amber monitors? I was told they're the best kind one can get.

A: Amber is apparently the best color you can get in a display. Studies undertaken in Europe seem to indicate that people have less eye strain and are more efficient working with an amber computer display than with any other color.

Green is better than white, though. As a result of the European studies,

Performance

Breakthrough...



... the CYBERDRIVE for the IBM Personal Computer

13.5 or 27 million bytes of disk capacity in a single cabinet with an integrated mini-cartridge tape for secure data backup.

Setting an exciting new microcomputer standard, the CYBERDRIVE combines a full package of features.

It offers new, higher performance levels, with an integrated business-oriented backup device.

As the CYBERDRIVE is made available for other systems, media transfer is assured regardless of the host hardware or Operating System.

The CYBERDRIVE slashes the seek time dramatically—e.g. the usual 5 Megabyte stepper-motor Winchester disk offers average seek time typically in the range of 100 to 200 milliseconds (incl. head settling).

With the CYBERDRIVE, the average seek time across more than five times as much data is only 33 milliseconds (incl. head settling).

This basic speed, coupled with disk cache buffering and a peak transfer rate of 1 million bytes per second, make the CYBERDRIVE a performance champ!

Trademarks of:

- | | |
|-----------------------------------|---|
| 1 - Cybernetics, Inc. | 2 - Ryan-McFarland Corp. |
| 3 - Micro Business Software, Inc. | 4 - Mini-Computer Business Applications, Inc. |
| 5 - Digital Research, Inc. | 6 - Phase One Systems, Inc. |
| | 7 - Bell Laboratories |

© Copyright 1982 by Cybernetics Inc. All right reserved.
Prices and specifications subject to change without notice.

The integrated mini-cartridge tapes used for backup of data allow dumping of (for example) 10 million bytes of data in about 10 minutes... much faster than other tape or floppy disk backup techniques. Hardware read-after-write error checking is incorporated in the tape device.

... And don't fail to ask about our superb lineup of serious business software (also offered in CYBERDRIVE format) including:

RM/COBOL² compiler—the micro industry standard.

MBSI³ RM/COBOL general business applications (derived from **MCBA⁴** minicomputer packages)... thousands in use... money back guarantee... source program license.

CRT¹ from Cybernetics (COBOL Reprogramming Tool!)—Program Generator for **RM/COBOL** to ease program development and maintenance... an alternative to a Data Base system.

CBASIC²⁵ & CBASIC⁸⁶⁵ compilers... for aficionados of a useful BASIC.

The software is available on a variety of industry-standard Operating Systems including CP/M⁵, MP/M⁵ (both -80 & -86), OASIS⁶, PC DOS, and UNIX⁷. Inquire for specific details and prices.

CYBERNETICS

8041 NEWMAN AVE., SUITE 208
HUNTINGTON BEACH, CA 92647
714/848-1922

CIRCLE 84

INTRODUCING

SAVVYTM



... the **PERSONAL LANGUAGETM** system
that mirrors your commands using
your own words!

What SAVVY is —

- SAVVY is a miraculous new information handling system.
- SAVVY is an automatic database management system.
- SAVVY is a new level of machine intelligence.
- SAVVY, part hardware, part software, is the beginning of truly "Personal Computing".



Trademark: SAVVY, Robot Programmer:
Excallbur Technologies Corporation.

Personal Language: SAVVY Marketing
International.

What SAVVY does —

Through SAVVY, you and your computer talk to each other in your own natural, conversational English (or Spanish, or French, etc.).

It learns from you what you want done in your own personal language. Once SAVVY learns your language it can create any file you wish. Input, output, additions, changes and deletions are arranged for you.

SAVVY's "Robot Programmer" has been trained to write 100% of the programs needed to manage your database information.

SAVVY runs on CP/MTM and Apple DOS.

What YOU discover —

You'll discover that SAVVY recognizes your personal words, even if misspelled, or even if you use a phrase never used before!

SAVVY continues to grow through use to become better and better at understanding your commands.

Eventually, you will see SAVVY as a mirror to your own way of thinking and working. It is a re-definition of "user-friendly".

SAVVY, it's the first system that truly means "personal computing".

SAVVY is like no other system on earth.

SAVVY cost \$950.

Seeing is believing. SAVVY is on display at selected computer retail locations. Call for the name of your nearest dealer.

CP/M is a trademark of Digital Research Corp.

Apple is a Trademark of Apple Computer Inc.

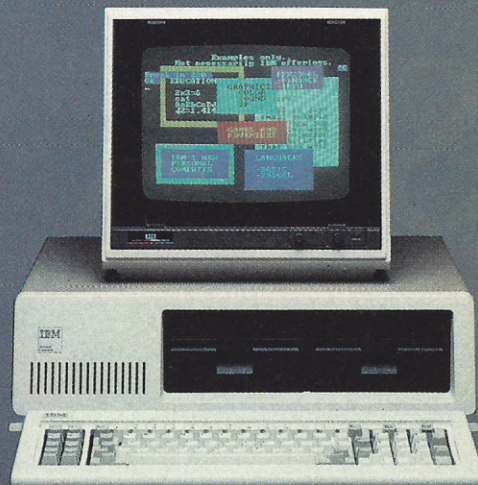
100 South Ellsworth Street, 9th Floor, San Mateo, CA 94401 (415) 340-0335

SAVVY

MARKETING INTERNATIONAL

GOOD NEWS

Have you put aside buying a color monitor because it's too expensive? But, have you looked at the new TAXAN RGBvision color monitor? Would you be excited at a suggested retail price of \$399.00 for the RGBvision I, and \$599 for the RGBvision II?

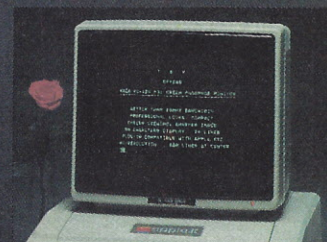


DO WE HAVE GOOD NEWS FOR YOU!

For those low prices, you can have:

- ✓ Full compatibility with Apple III and IBM PC without interface modules
- ✓ Compatible with Apple II through the TAXAN "RGB-II" card
- ✓ RGBvision I medium resolution - 380(H) lines
- ✓ RGBvision II high resolution - 510(H) lines
- ✓ Unlimited colors through linear amplifier video circuit and 16 colors for Apple III and IBM PC
- ✓ 12-inch, 90° deflection CRT display

Can you really afford to turn all that down without looking at the TAXAN RGBvision monitors? See your local dealer for a demonstration.



TAXAN 12" green phosphor monitor, model KG12N, features an 800 line resolution at center, 2000 character display.



TAXAN

TSK ELECTRONICS CORPORATION

1524 Highland Avenue
Duarte, California 91010
A subsidiary of Kaga Denshi

CIRCLE 53

Apple II and III are trademarks of Apple Computer, Inc.
IBM PC is a trademark of International Business Machines, Inc.

ANSWERS

several European countries adopted yellow, amber or green as colors to be used in monochromatic displays. In every case, compared with black-and-white monitors, the colored monitors resulted in less eye strain and greater efficiency. When the colors were compared among themselves, amber won hands down.

Many manufacturers now make amber displays, but not many of those show up in the U.S. market because most of those products are being shipped to Europe. This will change, however. At least one manufacturer, USI International, of Brisbane, Calif., showed nine-inch amber monitors for personal computers at this year's National Computer Conference.

Q: What's a printer/plotter? Can it do both printing and plotting?


A: Yes. It's a device that can both print and plot.

Some hard-copy output devices are optimized for printing, others for plotting. A printer/plotter does both jobs tolerably well.

Some printer/plotters are dot-matrix types. When they print, they use characters that are made up of dots arranged in a matrix to form the character—hence their name. When they plot, they use dots to form the lines of the picture they're plotting. Dot-matrix printer/plotters are OK, depending on their dot resolution. The more dots per inch they can place on the paper, the better the

lines and characters will look.

Other printer/plotters use pens to draw lines. They move the pen over the paper to form the characters. They are relatively slow compared to dot-matrix types, but their output looks better than the output of dot-matrix printer/plotters. They are also relatively expensive. Pen plotters cost about \$1500.

Probably the best known printer/plotter is one from Versatek, which print 200 dots per inch and runs almost as fast as a line printer. It's an electrostatic device, which means that it places dots of electric charge on the paper, the paper passes over a pigment reservoir, and the pigment is attracted to the areas of electrical charge. 

What is Unique-NISS™?

FREE CALL
FREE CATALOGUE

1 An unprecedented forecasting software support service that provides you with one-on-one interaction with our staff of professionals.

Maximize your personal productivity through the use of our forecasting software, a one-year service agreement, newsletters and prompt access via our toll-free hot lines.

2 The leading forecasting software packages available today for the leading personal computers.

Call us now and profit from the integration between you, the discerning end-user, and NISS, the unequalled direct support service.



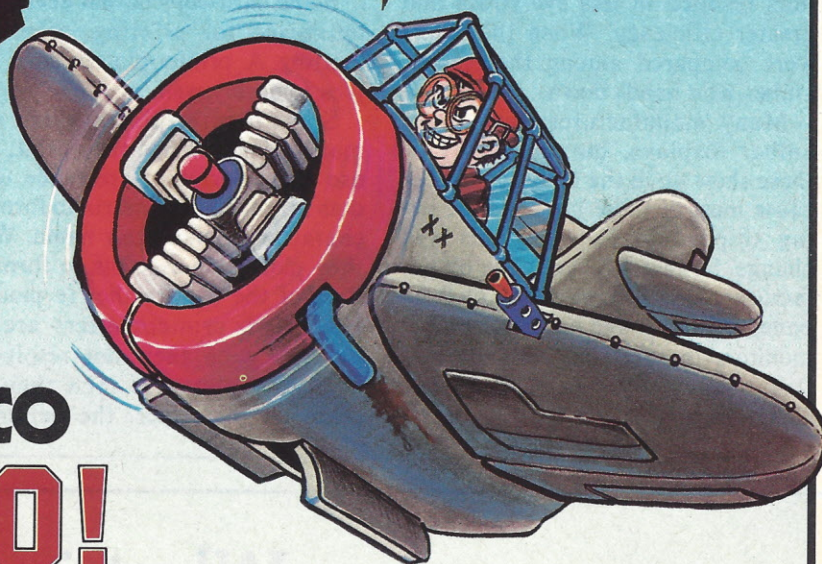
1-800-525-SOFT
In Colorado (303) 694-1994

8800 East Arapahoe Road, Denver, Colorado, 80112

PC 1082

KAMIKAZE™

**WIN
A TRIP TO
SAN FRANCISCO
AND \$5000!**

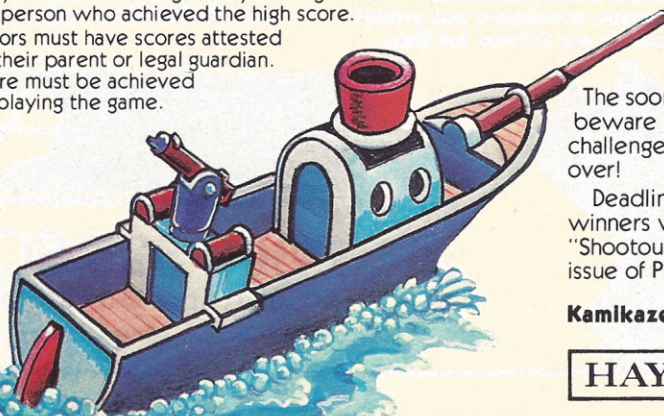


**Only One Thing Stands between You and \$5000
— A Crazy Dive Bomber!**

Play your best game and send us a photograph of your highest score. We'll take the top 5 scores submitted and send those overachievers tickets to San Francisco for the "Kamikaze Shootout" next February. We'll reserve hotel rooms, good food and 5 Apple computers, each loaded with Kamikaze ... then may the best gunner win!

Rules:

1. One entry per purchased copy (the entry blank comes with the game).
2. Entry blank must include the registration number of your game. The warranty registration must be signed and in the possession of Hayden Software for verification.
3. Entry blank must be signed by the registered owner and the person who achieved the high score.
4. Minors must have scores attested by their parent or legal guardian. Score must be achieved by playing the game.



5. Advertisers and employees of Hayden Publishing Co., Inc., and its affiliates, or members of their families are not eligible.
6. In the case of duplicate high scores, the earliest postmark will have priority. Any entries with illegible postmarks or illegible entry information will be returned or rejected.

Top scorer takes home a cool \$5000; second place gets you \$1000; third place wins \$500; fourth and fifth place winners each receive \$250 certificates good toward Hayden software.

The only way to win is to play ... the only way to play is to get your Kamikaze game with your entry blank from a Hayden Software dealer, or order direct at:

1-800-631-0856 Dept. #PC 02
(in N.J. call 201-843-0550, ext. 382).

The sooner you start, the more practice you get. But beware ... the better you get, the tougher the challenge — surprise enemies will be popping up all over!

Deadline for entries is January 15, 1983, and winners will be notified by January 31, 1983. "Shootout" winners will be published in the April issue of Personal Computing magazine.

Kamikaze, #13809, Apple II disk, \$34.95

HAYDEN SOFTWARE

PROFESSIONAL/ MANAGERIAL

**"Should you delay purchasing?
Most experts in the area
say it makes very little
sense to wait."**

WHAT SHOULD YOU PAY?

(continued from page 64)

has the most moving parts, the printer is the most expensive component of a computer system and the most trouble-prone.

A dot-matrix printer makes sense when you need an economical printer for internal use only. It forms letters from tiny dots. Matrix printers are your least expensive, starting around \$200 for those using adding-machine-width paper. Disadvantages: Usually characters are hard to read and special coated paper might be required.

If you do enough looking, you might find an inexpensive, good quality dot-matrix printer. "Ours is clear, crisp and attractive," says Pat Pav-

lick of Floral Creations in Danbury, Conn. "The printer produces our letters for prospective customers. It cost just \$500."

For correspondence, reports and other material where readability and appearance are important, you're more likely to settle on a letter-quality printer. It forms characters like a typewriter by striking the page with a typewriter-like font. Perhaps the least expensive versions are converted IBM Selectrics with the font on a ball. Daisywheel printers are a popular alternative. Manufacturers offer a wide choice of typefaces, both pica and elite sizes. Letter-quality printer prices start around \$1000 and can go up as high as close to \$5000.

Comparatively slow printers—

maybe 15 characters per second or a page every couple of minutes—are fine for light printing. With heavy printing requirements, though, such speeds can become a bottleneck. You might be better off purchasing a printer capable of 40 to 60 characters a second, or even more. Naturally, extra speed adds cost.

Continuous printing proceeds much faster with an automatic paper feed. Otherwise, somebody has to hover over the machine and feed sheets in, one at a time. An automatic paper feed sells for about \$2000.

• **What kind of follow-up service?** A computer is perhaps more reliable than most products of modern technology. Even so, it can break down.

What's the key to success in futures trading?

Fast, accurate information is essential in business decisions. How often have you learned about golden opportunities in the commodity markets *after* it was too late to really profit by them?

If you have an Apple, Commodore, IBM, Tandy or other personal computer, you can receive facts about futures prices and transactions as they're taking place on the exchange floor . . . with no time delay.

This continuous flow of information allows you to spot trends, formulate trading plans, and execute those plans with precise timing. You can also use it to prepare your own charts and forecasts.

Trans-Lux Data Network provides up-to-the-minute commodity quotations direct from the floor of the world's largest futures exchange—the Chicago Board of Trade. We transmit it the most accurate and useful way—ticker-tape style—showing bids, asks, spreads, trades and other information. Many subscribers are already receiving CBT data via personal computer, and you can, too.

Best of all, this service is available at a low monthly cost anywhere in North America.

Call Marianne Johnson for all the details and discover how you, too, can utilize your computer to improve your trading opportunities.

**Call toll-free 1-800-243-5544
in CT, call 203-853-4321**

TRANS-LUX DATA NETWORK

SOYBEANS .AUG 38.915 SEP 35.985 NOV 127.980 JAN 12.050 MAR

110 Richards Avenue Norwalk, Connecticut 06854

☐ Tell me more about the key to successful trading.

PC-1082

Name _____ Company _____ Phone _____ Address _____ City _____ State _____ Zip _____

☐ Call me

PROFESSIONAL/ MANAGERIAL

"I feel that the longer you delay implementing a computer system, the more money you lose. I should have had a computer years ago."

In most cases you're dependent on the dealer. Tony Passera, a Ridgefield, Conn. computer consultant and researcher, reports: "My keyboard failed this week. The machine diagnosed the problem itself, gave me a message telling me which part failed, and I just took it to a computer store—not even the one I bought the computer from. On the spot, in five minutes, they replaced the part."

You won't always be this fortunate. Ask how fast a dealer promises a service response, how many service people are available, the cost. Few dealers offer on-site service. Expect to haul your equipment to the dealer. If a dealer goes out of business, where else can you turn?


Ask for names of a store's custom-

ers, so you can ask about follow-up service. Don't buy from anybody who won't give you some names.

Details of a service agreement must be in writing. This is especially important if you buy a second-hand or discontinued computer that a store might not want to service.

OK. Having determined what you want a personal computer to do, you should have a good idea what kind of programs, memory, storage, monitor, keyboard, printer and follow-up service you want. Make a list of the essentials. This will help you narrow the possibilities quickly, because most computers will lack at least one. Then, as Tony Passera did, seek "the least expensive machine that gives you the function you need."

Should you delay purchasing until a more advanced, less expensive system comes along? Most experts in this area say it makes very little sense to wait. The immediate advantages that a business can expect from owning a computer will in most cases outweigh any savings that it might accrue by putting off the purchase.

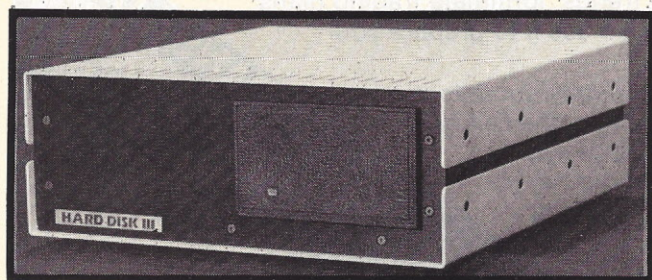
Personal-computer prices have come down substantially since Herbert Schlomann paid \$8500 for his a few years ago, but he doesn't mind. "If you do your homework and buy a computer suited to your needs, it can revolutionize your business. I feel that the longer you delay implementing a computer system, the more money you lose. I should have had a computer years ago." 

WHAT'S ECC?

ECC (Error Correction Code) is a polynomial derivative which is used to detect and correct errors. In simpler terms, this means that the computer will detect and automatically correct data errors sometimes generated spuriously in the equipment.

VR Data's HARD DISK III has this feature. If your system will abend or die during a data error or if you must always have the correct data for your functions, ECC is a necessity. This feature has filtered down from the larger computer systems and is now used by manufacturers of superior micro computer products.

Imagine a 5 meg Winchester Hard Disk with the following features:



ONLY
FROM **VRdata**

777 Henderson Boulevard N-6 Folcroft, PA 19032
(215) 461-5300 (800) 345-8102

**ALL
FOR \$1899. Complete**

- ECC—onboard buffer
- FCC approval—Heavy Duty Power Supply
- Automatic power on with system
- Heavy duty linear power supply
- Gold plated contact on all connectors
- Heavy gauge aluminum chassis
- 115/230 VAC 60/50 HZ Standard
- State-of-the-art controller
- 2 pass forced air cooling system

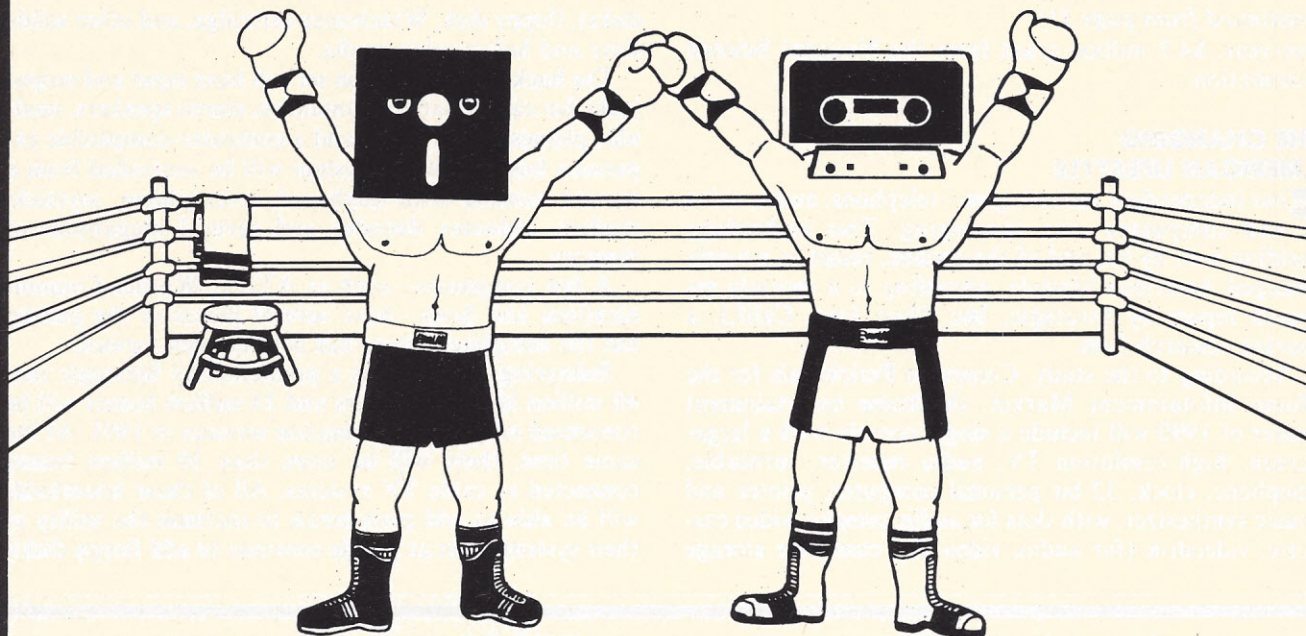
Interfaces to: Radio Shack TRS 80 Model I • Radio Shack TRS 80 Model III • IBM Personal Computer • Others to be announced

TRS-80
Model I

And In This Corner,
Another Champion.....

TRS-80
Model III

CLOAD'S DISK VERSION!



Get 12 tapes OR disks a year containing over 75 quality programs — without knocking out your budget!

We finally gave in . . . After over FOUR years of publishing some of the best (aren't we pompous), useful and fun programs on tape, we are now offering **CLOAD Magazine on disk**, too!

A subscription to **CLOAD Magazine** (tape or disk) consists of 6 to 8 ready-to-load programs delivered by First Class Mail every month. What a winner!

Fight high software prices — Get a subscription to **CLOAD Magazine**. Or just throw a single punch and try a back issue . . .

The Bottom Line:

	Tape	Disk
1 year (12 issues)	\$50.00	\$95.00
6 months (6 issues)	\$30.00	\$55.00
Single Copies		
Back Issues	\$ 6.00	\$11.00
Good Games #1	\$12.00	\$23.00
Adventures #1	\$13.00	\$24.00

California residents add 6% to single copies.
North America — First Class postage included.
Overseas — add \$10 to subscriptions and \$1 to single copies. Sent AO rate.

The Fine Print:

All issues from Oct 78 available on tape. Issues from Oct 82 available on disk, also. Ask for list (24 Level I issues also available).



(805) 962-6271

P.O. Box 1448
Santa Barbara, CA
93102

MasterCard/Visa

OUTLOOK

(continued from page 31)

five-year, \$4.7 million grant from the National Science Foundation.

THE CHANGING AMERICAN LIFESTYLE

Four independent technologies—telephone, audio, video and computers—are converging. This technology melding will, by the end of the decade, result in a vastly changed American lifestyle, according to a recently released report by Strategic, Inc. (San Jose, Calif.), a market-research firm.

According to the study, Computer Peripherals for the Home Infotainment Market, the home entertainment center of 1990 will include a single console with a large-screen, high-resolution TV, audio receiver, turntable, telephone, clock, 32-bit personal computer, printer and music synthesizer, with slots for audio cassette, video cassette, videodisk (for audio, video and computer storage

disks), floppy disk, Winchester cartridge, and other solid-state and holographic media.

The back of the television set will have input and output jacks for cables, satellite antennas, stereo speakers, modular phones, power plugs and a computer-compatible expansion bus. The whole system will be controlled from a remote console with keyboard, microphone, joystick, modem, videotex decoder and several megabytes of memory.

A few companies—such as AT&T, Warner Communications and Sony—have several pieces of the puzzle, but the complete picture has not yet been formed.

Bolstering the report is a prediction by Strategic that 40 million home computers and 24 million homes will be connected to remote information services in 1991. At the same time, there will be more than 30 million homes connected to cable TV systems. All of these households will be able to add peripherals to increase the utility of their systems, just as people continue to add floppy disks,

Extended BASIC

TRS-80 Color Computer

The Champagne of Software For a Beer Budget!

**Over 75 quality programs a year
for under 75¢ each!**

Ah, **CHROMASETTE** Magazine, the toast of the holiday season . . . and any season! A subscription to **CHROMASETTE** Magazine consists of 6 to 8 premium programs ON CASSETTE, delivered by First Class Mail to you and your computer every month! Tutorials, utilities, games, and practical programs to usher in a great new computing year!

So, celebrate and get a subscription to **CHROMASETTE** Magazine! Or just take a little sip and try a back issue.

The Bottom Line:

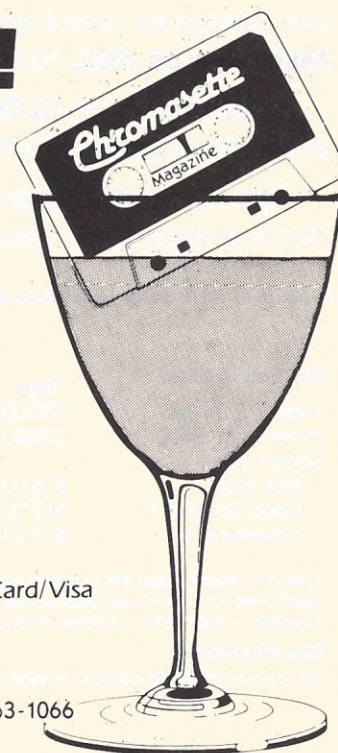
1 year (12 issues) \$45.00
6 months (6 issues) \$25.00
Single Copies \$ 5.00

Calif. residents add 6% to single copies.
North America — First Class postage included.
Overseas — add \$10 to subscriptions and \$1 to single copies.
Sent AO rate.

The Fine Print:

All issues from July 1981 available — ask for list. Programs are for the Extended BASIC model and occasionally for disks.

Chromasette Magazine P.O. Box 1087 Santa Barbara, CA 93102 (805) 963-1066



MasterCard/Visa

PERSONAL COLOR GRAPHICS

Personal Color Graphics Has Arrived

Turn your IBM PC, Apple II, or Apple III into a color graphics system by adding a PrintaColor PG-1000. Personal graphics ...in color...at your finger tips. The PG-1000 transforms dull and difficult to understand graphics into easily understood vivid color images. PrintaColor's PG-1000 is the perfect blend of printer capabilities, making available for the first time one printer that combines quality text, graphics and color.

Quality Performance

The PG-1000 is designed for the professional who requires high quality color output in minutes, not hours. Utilizing ink-jet technology, precision images containing over 125 shades of colors can be produced. An 8½ by 11 inch image is produced typically in under two minutes. 1440 dots per line give your copies the crisp definition required for detailed graphics.

Easy To Use

PrintaColor's PG-1000 is designed to be at home in any office environment. Whisper quiet operation and compact size allow the PG-1000 to be your desk-top printing companion. Color images are produced on readily available computer paper. The ink is contained in a snap-in, disposable cartridge which inserts in seconds, producing on average over five hundred color copies. There is no

waiting for inks to dry, pens to clog, and no ribbon to replace. Multiple copies are as easy as keying in the number desired...each an original.

A Complete Printing System

The PG-1000 is a complete color printing system including everything you need from the printer to a box of paper. From the moment you unpack your printing system you are ready to begin producing color graphic images with your personal computer. An easy to install interface card and cable connects the printer to your system. Software is included to facilitate copying the graphic screen in color, whether you use a black and white or a color monitor.

A box of paper and an ink cartridge rounds out a complete compliment of items that allow color printing from your own graphics software or many commercially available software packages. Retail price \$4,995.

Built For Reliability

The PG-1000 utilizes a rugged carriage designed for long life. It has a rated life greater than 6000 hours MTBF. The color head has a proven reliability of greater than 10¹⁰ operations. A six month warranty is standard with factory maintenance contracts available on an annual basis.

For the name of your nearest dealer call or write



CORPORATION

5965 Peachtree Corners East
Norcross, Georgia 30071

(404) 448-2675

CIRCLE 104





HOW WOULD YOU LIKE ANOTHER FULL TIME JOB?

That's what you would have if you tried to keep up with even a small portion of the new releases.

At Peelings II we make that job easier for you by reviewing some of the most interesting products and programs on the market today, and keep you current with follow-up reports. We test everything with the end user in mind, so that you can face your purchasing decisions with confidence rather than hope.

In a market where slick advertising and flashy packaging are becoming the norm, doesn't it make sense to get your education about a program or product before you buy!

Subscribe to Peelings II today and start receiving THE magazine of Apple hardware/software evaluation. It will give you the edge on your purchasing decisions.

Peelings II

THE MAGAZINE OF APPLE SOFTWARE AND HARDWARE EVALUATION

P.O. Box 188, Las Cruces, N.M. 88004

☐ Payment enclosed \$21 for 9 issues ☐ Renew my subscription
 \$38 for 18 issues ☐ Enter my subscription

Charge to:

☐ Master Card ☐ Visa Card # _____

Four digit bank # above name _____ Exp. Date _____

Signature _____

☐ Send First Class Mail (extra \$7.50/year) Required for Canada, Mexico
 Foreign Subscribers (except Canada, Mexico) add \$23/year for Air Mail Post

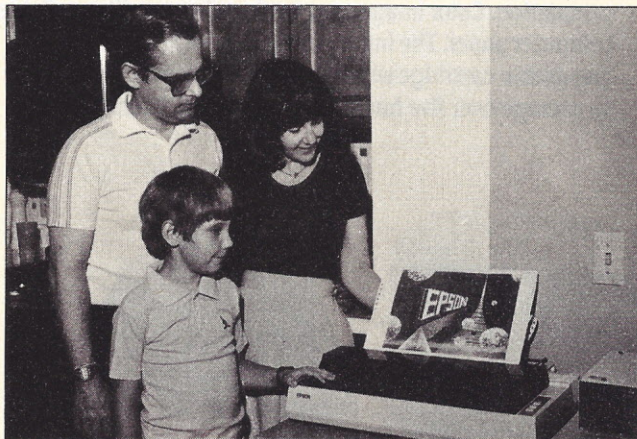
OUTLOOK

modems, and printers to their computers, and VCRs to their TV sets.

"ROAD INTO SPACE" WINS SWEEPSTAKES

When Ben Lanterman bought an Epson MX-100 printer a few months ago, he never dreamed it might take him to Japan. Lanterman, a 39-year old aerodynamicist from Bridgton, Mo., has been named the grand prize winner in the Epson "Softwear" Sweepstakes. And his winning printer graphic, entitled "Road into Space," has won him a week's stay for two in Tokyo, courtesy of Epson America. The design will be used on the official Epson T-shirt.

Lanterman says he got into computers "a couple of years ago," when his 10-year-old son, Aaron, expressed an interest in the subject. His painting led Lanterman into



Ben Lanterman, his wife Bonnie, and son Aaron, look on as their Epson MX-100 printer recreates the grand prize winning entry, "Road Into Space," for which they won a trip to Japan.

computer and printer graphics. Lanterman says he soon outgrew the printer, which came with his original Apple II system, and became interested in Epson printers after having seen a graphic demonstration.

The design came about, he says, when he was playing with the Epson name on the screen, and his wife, Bonnie, suggested he make it recede into space and add a few planets to amplify the space theme. Lanterman made about 20 separate entries to the Epson contest, working an average of 10 to 15 hours to perfect each entry.

Other winners in the contest were F.S. Kalinowski of Orlando, Fla., who won an Epson MX-100 for his second place entry, and John Stedford of Twin Falls, Idaho, who won his-and-hers Seiko quartz watches as third prize.



Information Filing Just Took a Superstep Into The Future — Superfile

If you can't always find the exact files you want . . . If your records or letters "fall through the cracks" . . . If your employees waste time on inefficient file searches . . . You need Superfile!

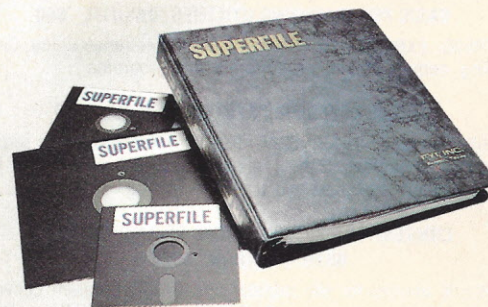
Superfile is an easy to learn, easy to use system that lets you file, cross index, and retrieve text entries. No programming needed. No retyping of your present entries.

Superfile can organize your:

- customer and client information
- sales leads
- correspondence
- library and journal abstracts
- personnel records
- mailing lists
- card files
- **And much, much more!**

Only \$195 (including manual with many examples, and DEMO data base). Try Superfile at our risk for 30 days. If Superfile doesn't do the job you want it to, return it for a full refund. Call toll free to order your copy of Superfile today.

Superfile trademark of FYI, INC.
CP/M registered trademark of Digital Research
Z-80 registered trademark of Zilog



SUPERFILE™

—FYI, INC.™—

P.O. Box 10998 #615

Austin, TX 78766

(512) 346-0133

1-800-531-5033 toll free outside TX

**Get The Most From Your NEC PC-8001
With RACET COMPUTES Software!!**

RACET NECDOS does more for your PC-8001 than any other DOS. It's faster, more efficient and easier to use. It's loaded with extra features to let you stretch the limits of your system. This advanced operating system works with the ROM NBASIC to give full compatibility with color and other BASIC commands.

EMPHASIZES INTEGRITY. NO MOUNT or REMOVE commands. Excellent protection from improper diskette swapping. AGAIN, HELP, FIND and REF commands. File password protection.

ADVANCED FEATURES. All DOS functions and commands may be used directly in a BASIC program!!! Special RUN option allows merging of programs, retaining all variables in memory. Fixed block spanned records. AUTO and DO commands. Machine language loads and saves. MATPRINT and MATINPUT to disk. Complete directory. ALL supervisory calls documented and available to the machine language programmer. Superzap utility included.

★ NEW ★ ELECTRIC PENCIL* ★ ★ \$99.95

THE most popular Microcomputer Word Processor in the world now available on the NEC!!! With many added features. Embedded print commands. Print from memory and disk!! Settable tabs. Indent and hanging indent. Parallel, Serial, and Video drivers. DICTAMATIC cassette control for translating dictated messages!! And much more!!! Most features of word processors costing five times as much!!! Runs on 32K or 64K system!!!

★ NEW ★ ELECTRIC SPREADSHEET* ★★ \$75

A BASIC Spreadsheet program for the PC-8001. Anything you work with columns and rows and a calculator belongs on the Electric Spreadsheet. Results formatted for screen or printer. 'What if' questions answered. P/L forecast. Personal budget. Real estate investment. Net worth forecast. Cash flow estimates. Business forms. Works on 32K or 64K system!!! 70 operators plus histogram plot, revise spreadsheet layout, and more. Select preprogrammed operators for line, column, or cell calculations. Set column widths and number of decimals. Manual and diskette include 22 examples.

★ NEW ★ ADVANCED PROGRAMMING BASIC ★ ★ \$60

THE functions and commands in this package give you extended control over data and your PC-8001 system. These extensions to NBASIC provide complete conversion of time and date functions including days between dates and Julian dates. Extended string functions include justify, truncate, center, rotate, translate, shift, pack, and search. Array functions include masked search of both sorted and unsorted arrays, and insert in sorted arrays.

MULTI-KEY SORT 'MKS' \$60

SUPER FAST Machine Language In-Memory Sorts. Three key sort on 500 elements in 4 seconds!!! Simple one-line BASIC functions - SORTV and SORTC verbs. Mixed ascending and descending keys.

BASIC PROGRAMMING UTILITIES 'BASUTIL' \$60

COMPRESS, EXPAND, PRETTY, XREF Cross Reference Utility. Great for modeling, debugging and structuring BASIC programs.

KFS-80 KEYED FILE SYSTEM 'KFS-80' \$150

MACHINE language BASIC ISAM utility provides keyed and sequential access to multiple files. Simple interface to BASIC. Binary tree keyed-file index system provides rapid access to records.

**CONVERT TRS-80* PROGRAMS TO RACET NECDOS
WITH 'PROTRAN' \$99.95**

COMPLETE utilities for file transfer and BASIC program conversion. Mod III diskettes may be read directly; Mod I and II via RS-232. Transfer BASIC programs, data files, or machine language files. NO SUPPORT is provided for conversion of machine language files or PEEK's, POKE's or USR's to function on PC-8001. Substantial knowledge of TRS BASIC and NBASIC required. Package designed for software authors.

AVAILABLE FROM YOUR LOCAL NEC DEALER or from RACET COMPUTES

**CHECK, VISA, M/C, C.O.D.,
PURCHASE ORDER**
Telephone Orders Accepted
(714) 997-4950

RACET COMPUTES LTD.
Integrity in Software

1330 N. Glassell, Suite M, Orange, CA 92667 (714) 997-4950

*TRS-80 IS A TRADEMARK OF TANDY CORPORATION
ELECTRIC PENCIL IS A TRADEMARK OF MICHAEL SCHRAYER
*ELECTRIC SPREADSHEET IS A TRADEMARK OF DAN G. HANEY & ASSOCIATES

CIRCLE 141

OUTLOOK

MORE KIDS LEARN BY COMPUTER

Fifty percent of the student population in U.S. schools and colleges will be receiving computer-assisted instruction (CAI) by 1987. That's up from about 25 percent today, according to a recently released study by Frost & Sullivan, Inc., a New York-based research firm.

Entitled "The Market for Computer Assisted Instruction in U.S. Education: A Five Year Projection," the 259-page report forecasts that the growth of CAI will be due mainly to personal computers. The machines not only afford lower costs, but represent greater autonomy for educators.

This scenario applies to all three categories of schools surveyed—elementary/secondary, community colleges, and four-year colleges and universities. Community colleges will pace the growth, with 52 percent of the schools now using CAI increasing to 85 percent in 1987.

Students will be exposed to more simulation and tutorials, a change from purely drill-and-practice exercises that are so common today, the report states.

The elementary/secondary schools—the newest entrants to CAI—plan to double the number of personal computers to about 424,000 units in 1987; the amount of districts using CAI will increase from 65 percent to 80 percent.

Despite the favorable outlook for CAI, two problems loom: lack of knowledgeable practitioners to serve as consultants and the slow development of peer-reviewed quality courseware. The latter has led to a large number of specialty companies and distributors entering the field.

THE "FEDERAL EXPRESS" OF ELECTRONIC MAIL

In what could be a preview of nationwide electronic-mail delivery, over 18,000 subscribers to The Source can now compose and send Mailgram messages from their personal computers to anywhere in the United States including Alaska and Hawaii. The messages are guaranteed next business day delivery if entered in The Source by four p.m. Eastern Standard Time. To ensure confidentiality, only senders and recipients are permitted to read the messages.

To use the service, subscribers sign on to The Source with a personal computer, data terminal or communicating word processor. They then type MGRAM and are prompted to enter names, addresses and messages. Messages can be reviewed on the screen, and changes in text can be made before transmission. Messages can be sent to single or multiple addresses. There is no limit to the number of messages that can be sent.

Features of the Mailgram service include: the ability to

The entrepreneurs guide.

OVER
40% OFF!

The business world. It's a jungle out there! And whether you've got your own business already, or still are thinking about it, you need VENTURE. The magazine for entrepreneurs.

To be successful, you need to make the right decisions, and VENTURE will give you all the information you need.

How do you collect the capital needed to strike out of "the mold"? What do you invest that capital in? And how do you break even?

VENTURE knows. VENTURE will give you the edge you need when you're out on your own by probing the many provocative issues in the business world today.

Each month, it will guide you with fascinating articles about other entrepreneurs: how they build

their businesses into successes, and all the problems they encounter along the way. You'll learn where the business opportunities of the future lie and how to know which one is right for you through articles on topics such as:

FINANCING

How you can get a venture capitalist to reconsider your proposal after he has rejected it. Who can and cannot be stretched in delaying payments, and how that knowledge can help you as an entrepreneur.

FRANCHISING

Why careful research can teach you how to build healthy revenues, while protecting yourself against policies that can cut into franchise earnings.

WASHINGTON

Up-to-date reports of current issues on Capitol Hill that

may affect your business. And, how the government helps and hurts you.

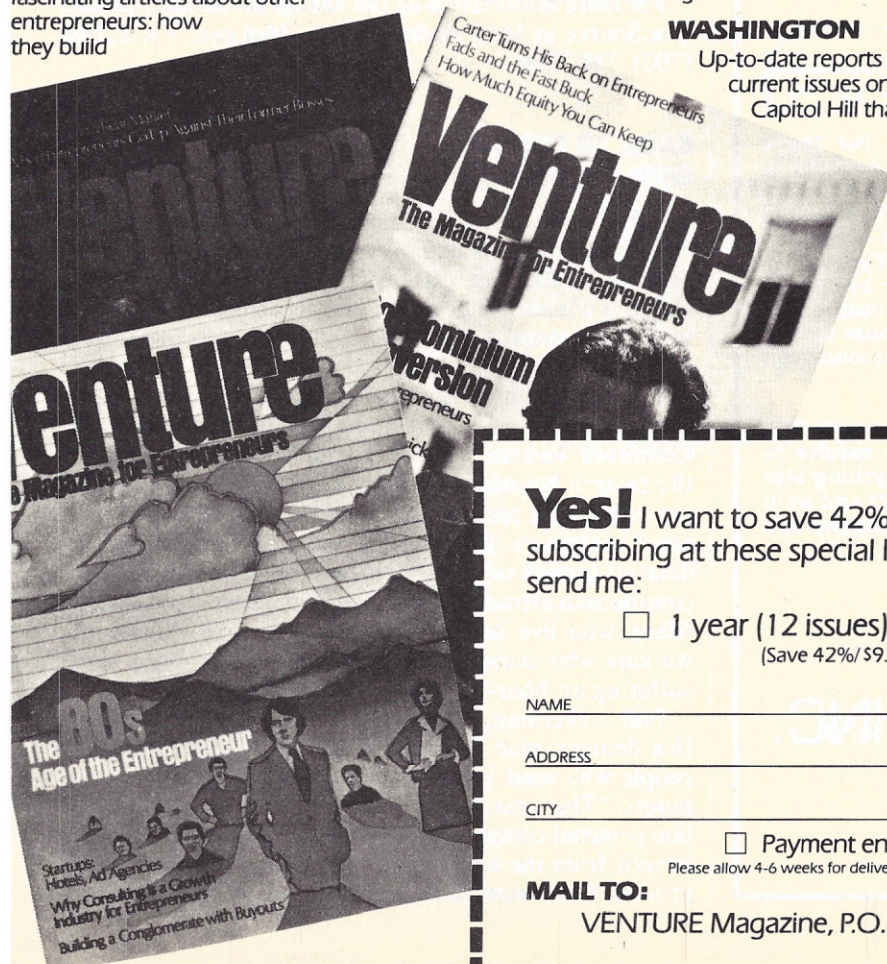
TAXES

How to make the system work for you. How, with careful planning, you can reduce your taxes by maximizing your investment credit. And how to avoid stiff penalties by paying close attention to the estimated Federal income tax payment rules.

NEW ISSUES

New developments in the entrepreneurs' world that could save you precious time and money. How using a regional broker can pay off in the long run when you're planning to take your company public. And why you should be wary of including insiders shares in a first time offering.

So don't struggle through that business jungle all by yourself. Subscribe to VENTURE and get the help you need. Reserve your subscription now and take advantage of our special low introductory rates. A one year (12 issues) subscription costs only \$12.00. That's a 42% savings off the regular cover price! Order now and start your VENTURE today!



Venture
The Magazine for Entrepreneurs

Yes! I want to save 42% on my subscription to VENTURE by subscribing at these special low INTRODUCTORY RATES. Please send me:

☐ 1 year (12 issues) of VENTURE for only **\$12.00!**
(Save 42%/\$9.00 off the regular cover price)

NAME _____

ADDRESS _____

CITY _____

STATE _____

ZIP _____

☐ Payment enclosed

☐ Please bill me

Please allow 4-6 weeks for delivery of first issue. **OR CALL TOLL FREE 800-247-5470**

MAIL TO:

VENTURE Magazine, P.O. Box 10771, Des Moines, Iowa 50349

If You Have A Printer

You need our PRINTER OPTIMIZER. We have two gripes with computer printers: one, no matter how fast they print they're much slower than a computer. So here you are with all this processing speed, sitting there waiting for your printer to finish. Two, almost all printers offer a bunch of features like various type sizes, forms control, graphics, enlarged character sets, etc. - but how are you supposed to access these features? Oh sure, the printer manual says: "print an ESC character followed by a CONTROL "K" followed by a three digit value equal to the desired page length...", but how do you do this in the middle of your spreadsheet program? And how do you access all those extra symbols and graphics with a puny half-ASCII keyboard?



Before Mediamix grew into Applied Creative Technology Inc., the idea people there decided to develop the Cuisinart® of the computer industry - a "magic box" that features 64,000 to 256,000 characters of spooling printer buffer, total character retranslation capability including macros, a keyboard that lets you directly select complete printer control sequences with the ease of a pushbutton car radio, adapts serial printers to parallel computers and visa versa, plus many more imaginative features. So many useful features that regardless of the printer you own - our PRINTER OPTIMIZER will bring your printer "up to speed" with the rest of your system and let you take full advantage of it.

If You Need A Letter Quality Printer



Consider our affordable alternative. For those of you who did not see the review of our product in the July issue of BYTE, we produce a little white box that converts an IBM Electronic Typewriter into a high quality Serial or Parallel computer printer. And now our ETI² (Electronic Typewriter Intelligent Interface) attaches to other brands of electronic typewriters. There are a number of arguments in favor of choosing this route over a mere computer printer and we have a brochure on the subject that you should read.

We apply technology creatively, and you'll find that not only can we communicate the results to you, but each product is better than anything else like it on the market. Call 1-800-433-5373 and we'll send you more information about our company and our products.

APPLIED CREATIVE TECHNOLOGY, INC.

2723 Avenue E East, Suite 717
Arlington, Texas 76011
(817)-261-6905
(800)-433-5373

OUTLOOK

receive confirmation of the message, or duplicate copies that include the names and addresses on all the messages sent; save the message in a personal file on The Source for later reference; arrange for the Mailgram Message Processing Service to enter names and addresses of large lists at a cost of 35 cents each; and store long address files with the Message Processing Service for a small fee.

The messages are electronically forwarded by The Source to Western Union's largest Mailgram processing center. They are then routed by ZIP code to the serving post office nearest the addressee, where they are printed, enveloped and given preferential delivery treatment.

A single message on The Source costs \$5.15 for up to 100 words, with an additional \$1 charge for each additional 100 words. Discount rates are also available for quantity mailings of the same message. At the discounted rate, two to 25 messages cost \$4.25 each, 26 to 100 messages cost \$3.50 each, and 101 to 200 messages cost \$3 each. In each case, another \$1 is charged for each additional 100 messages. The cost of sending messages is billed to subscribers monthly, along with other charges from The Source.

For more information on the Mailgram service, contact The Source at 1616 Anderson Rd., McLean, VA 22102; (703) 734-7500.

BACK TO SCHOOL WITH A COMPUTER

With the exploding sales figures the personal computing industry is presently experiencing, more people are deciding that teaching about the small machines is a lucrative business. Hence, centers that propose to teach business executives about computers are springing up all over the country.

One such center that just came to *Personal Computing's* attention is Entech, located in Commack, N.Y. Commack, located on Long Island about 60 miles east of the eastern boundary of New York City, is a somewhat out-of-the-way place for a school that teaches about personal computers. But the area has experienced some industrial growth over the past few years, and this growth continues to attract management-level people to the area. Many who live in the Commack area are white-collar workers who commute every work day into New York, suffering an hour-long train ride each way.

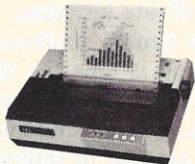
Phil Ackerman, Entech president, clearly hopes that this demographic mix will result in a large number of people who need instruction in the use of personal computers. "This year," says Ackerman, "more than one million personal computers will be sold. Most purchasers can benefit from the equipment but have no computer background. Until now there has been no place in this area

OUR PRICES, SELECTION AND SAME-DAY SHIPPING MAKE US COMPETITIVE. OUR PEOPLE MAKE US EXPERTS.

Red Baron. Home of the Nation's Largest Computer Printer Inventory.

NEC 8023

Outstanding Graphics, Print
Quality & Performance

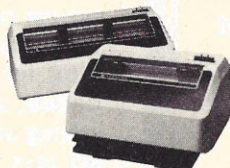


144 x 160 dots/inch • Proportional Spacing
• Lower case descenders • N x 9 dot matrix
• 8 character sizes • 5 unique alphabets
• Greek character set • Graphic symbols
• 100 CPS print speed • Bi-directional logic-
seeking • Adjustable tractors • Single-sheet
friction feed • Vertical & horizontal tabbing

NEC 8023
Dot Matrix List \$795 **\$Call**

IDS Prism 80/132

Affordable Color, Speed

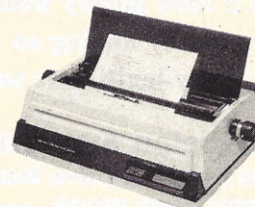


Dot Resolution Graphics • 9-wire staggered
printhead • Lowercase descenders • Over
150 CPS • Bi-directional, logic-seeking
• 8 character sizes • 80-132 columns
• Proportional spacing • Text justifications
• Optional Color

Prism 80 Base List \$999 **\$Call**
Prism 132 Base List \$1,299 **\$Call**

Smith-Corona TP-1

Daisy Wheel Printer For Under \$900



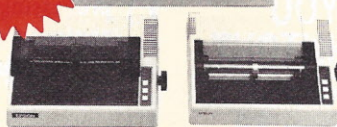
Letter quality • Standard serial or parallel data
interface • Drop-in ribbon • 144 WPM • Various
fonts available • Loads paper like typewriter •
Handles single sheets for forms

Smith-Corona TP-1 List \$895 **\$Call**

Televideo CRT's Price, Performance & Reliability

910 List \$699 **\$Call**
925 List \$995 **For low**
950 List \$1195 **Prices**

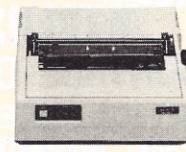
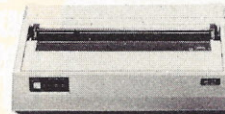
The Epson Series High-Quality Printers at a Low Price.



Epson MX80 List \$645 **\$Call**
Epson MX80FT List \$745 **\$Call**
Epson MX-100 List \$995

Full Line of Epson Accessories.

The Okidata Series Hi-Res & TRS 80 Block Graphics



120 CPS • 9 x 9 Matrix • Bidirectional logic
seeking printing • Lower case descenders
• Four print styles • Optional Hi-Res Graphics

Okidata 82A List \$649 **\$Call**
Okidata 83A (w/Tractor) . List \$995 **\$Call**

Other Quality Printers at Red Baron

	List	Discount
Anadex DP-9501A	\$1725	\$Call
Anadex DP-9620A	\$1845	\$Call
Anadex WP-6000	\$3250	\$Call
C. Itoh 8510 Prowriter	\$845	\$Call
IDS Microprism 480	\$799	\$Call
Diablo 630/6	\$2995	\$2570
NEC Spinwriter RO		
Serial Parallel 77xx	\$3055	\$2500
Parallel 35xx	\$2290	\$1900

Interface Equipment

Complete Stock of Options.
Cables and Accessories.

GRAPPLER + APPLE INTERFACE \$175
CCS APPLE SERIAL Interface & Cable . \$150
ORANGE INTERFACE for Apple II
Parallel Interface Board and Cable .. \$90
NOVATION D-CAT
direct connect modem \$180
Novation Cat Acoustic Coupler \$175
COMPLETE STOCK OF EPSON
ACCESSORIES **\$Call**
CUSTOM PRINTER CABLES FOR Apple,
Atari, IBM, TRS-80 (all models) **\$Call**
HAYES MICROMODEM II \$300
PRINTER STANDS: Large \$99
Small \$25
PRINTER RIBBONS—Most Types **\$Call**



Our People, Our Product: Both Are Specialized.

Red Baron is an organization of compu-
ter printer specialists. They know the
capabilities of each printer, and how to
match one to your exact need. Call for
expert consultation today!



Here's How To Order:

Phone orders are welcome; same-day shipment on
orders placed before 11:00 a.m. Free use of Master-
Card and Visa. COD's accepted. Personal checks
require 2 weeks clearance. Manufacturer's warranty
included on all equipment. Prices subject to revision.
APO/FPO Orders Welcome.

Call For Free Catalog:

(800) 854-8275
CA, AK, HI (714) 630-3322



It's never too late to
start saving
money



The ACCOUNTANT

Finance Data Base System \$129

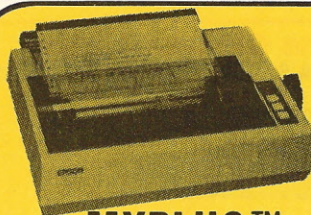
Optional VisiCalc™ Interface \$20

Allows you to define up to 63 codes.
You'll save money when you prepare
your taxes by having an accurate record
of every legitimate tax deduction.

Decision Support Software
1438 Ironwood Drive, McLean, VA 22101
Call (800) 368-2022 or (703) 241-8316

VisiCalc™ is a trademark of Personal Software Inc.

CIRCLE 109



EPSON MX-80 AND MX-100 OWNERS

MXPLUS™ GIVES YOU
CONTROL OF YOUR PRINTOUT

- SELECT CONDENSED, **BOLD**, OR WIDE PRINT INSTANTLY USING THE PRINTER PANEL BUTTONS. (NO COMPUTER CONTROL CODES REQUIRED)
- ACTIVATE PERF-SKIP AND LEFT MARGIN INDENT TO **AUTOMATICALLY** FORMAT YOUR PRINTOUT INTO NEAT PAGES THAT CAN BE PUNCHED AND BOUND.

MXPLUS™ INSTALLS IN MINUTES, NO SOLDERING!

MXPLUS IS A PLUG-IN MODULE FOR ALL EPSON MX-80/100 PRINTERS AND IS COMPATIBLE WITH ALL INTERFACE BOARDS. MXPLUS HAS A 1 YEAR WARRANTY.

ORDER TODAY

ORDERS CALL 24 HR. 800-835-2246 x441
INFORMATION CALL 213-969-2250

DRESSELHAUS COMPUTER PRODUCTS
BOX 929
AZUSA, CALIFORNIA 91702

ONLY
\$49.95

POSTPAID CALIF. ADD 6%
SAME DAY SHIPPING
WITH MC/VISA



OUTLOOK

where unbiased professional help could be obtained. Entech, the Computer Skills Center, was created to fill that need."

Entech proposes to teach people all they need to know about selecting and using a personal computer. It offers seminars on topics ranging from the essentials—assuming no prior knowledge—to the advanced operation of the most sophisticated hardware and software available. The classes are being taught, says Ackerman, in Entech's modern facility, although arrangements can be made for custom training programs at off-site locations.

Maude Ackerman, who has been a professional educator for a number of years and is now the director of Entech, says that most of the customers the company is getting are from the local area. "We opened this center," she says, "with a tremendous amount of interest. We're right next to an industrial park here, and most of the people who are coming in are businessmen from this area. But right now Phil is talking to some people from New York about setting up a training program to be taught there."

Entech seminars will cover such topics as:

- Selecting and using a computer for your business or profession;
- Forecasting with VisiCalc/SuperCalc;
- General accounting with a computer;
- Programming in BASIC; and
- Word-processing hardware and software.


Entech will provide training in a variety of word-processing software packages on Apple and IBM personal computers.

For more information, call Entech at (516) 543-3352.

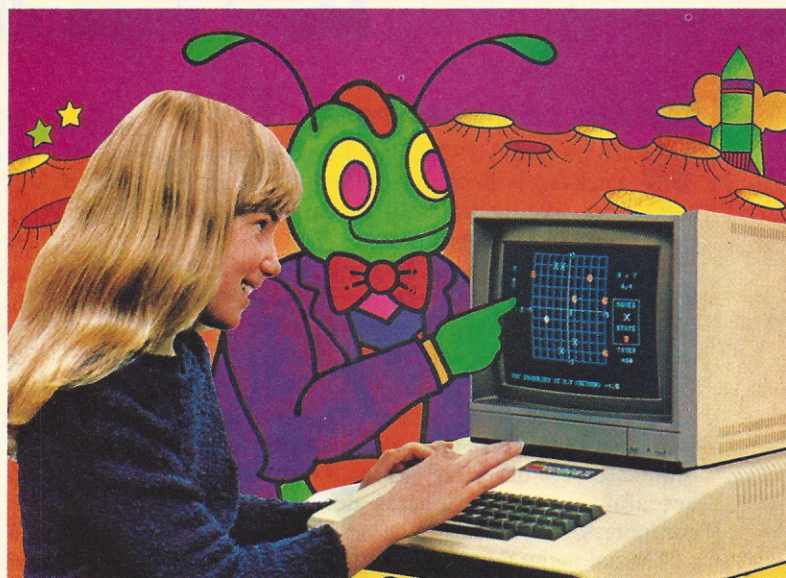
VIDEO GAME BUSINESS TO SHIFT TO PERSONAL COMPUTERS

The home/video game business of the 1980s will shift in emphasis from stand-alone units to the growing base of installed personal computers, according to a 210-page report from International Resource Development, a Connecticut-based market-research firm.

The study, Video Market Opportunities, estimates that by 1990, about 35 percent of homes in the United States will have some type of video game system. Increasingly, however, traditional units will be passed over in favor of games-capable personal computers. The attraction, according to the report, is that as the technology improves and becomes cheaper, personal computers will become fully competitive with dedicated video game machines while offering much more overall utility to the user.

Nearly \$4 billion worth of games-oriented personal computers, those generally retailing for less than \$1000, will be sold in 1992, the report says. This figure represents approximately one-quarter of the entire market. 

CIRCLE 110



NOW THE COMPUTER AGE IS THREE TO THIRTEEN.



With Computer Learning Games™ from The Learning Company and an Apple computer, you can give your kids one of life's greatest gifts — the love of learning.

As the company that makes learning playful, we can help you give your kids a head start on life.

Younger kids will learn direction concepts like "above or below" and "left or right." Older kids acquire logic skills while creating patterns

with colors and shapes. They'll also learn computer-age skills like number plotting and computer chip circuit design.

All learned from creative games using imaginary characters and lively themes. From Juggles' Rainbow to Gertrude's Puzzles, there are six packages in all.

So if you've got kids aged three to thirteen, take them to your local Apple dealer and try our learning games.

Then you'll see how exciting learning really can be.

Please send me a copy of your computer learning games catalog.

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

The Learning Company
4370 Alpine Road, Dept. 101
Portola Valley, CA 94025
(415) 851-3160



CIRCLE 111

Graphics, Training And Portable Systems That Meet Executive Needs

PORTABLE COMPUTING POWER

With its new HP-75C hand-held computer, Hewlett-Packard is bridging the gap between its desktop computers, like its Series 80 machines, and even smaller computers, like the 41C.

This new machine can be programmed in BASIC, and will be provided with the ability to do graphics and spreadsheets. It is truly portable, thanks to its memory that can retain data while the power is off, and its small (10-inch by 5-inch by 1.25-inch) size.

The machine also features a built-in Hewlett-Packard Interface Loop (HPIL) that allows this machine to communicate with other HP personal computers. Thus it can act almost as a peripheral device to larger personal computers.

The company thinks that initial customers for this computer will come from the firm's traditional base of customers—technical and financial professionals. But that focus will shift very soon because new software will be available to tempt the “mobile” businessman who needs, or just wants, access to information wherever he might be, the company says.

The HP-75C portable computer features 16k of user

RAM, which can be increased to 24k with a plug-in memory module. There are three software plug-in ports that accept 8k or 16k ROM modules so the machine can be customized for particular applications, while the user memory is kept free for data. There's also a ROM-based operating system that takes up 48k, so the user can actually have as much as 120k of memory going for him, if he's added the 24k expansion and counts the operating system's RAM in the package. Since the operating system is in ROM, the computer is ready for action as soon as it's turned on. The user has 169 instructions to the operating system, 147 of which are BASIC commands, statements or functions.

HP claims that owners can touch-type on the keyboard, which is a “QWERTY” pad. Every key can be redefined and the newly defined keys given new labels with snap-on keyboard overlays. The keyboard also has a “hidden” numeric pad for entry of large volumes of numeric data. The liquid-crystal display is only one line of 32 characters, but it acts as a window on a larger, 96-character line. If the user purchases an optional video monitor, the computer can display a normal page of data (16 lines by 32 characters).

For program or data storage, HP has included a pull-through magnetic-card reader. Cards can store 1.3k. The reader is a pull-through device rather than a powered one, which saves battery life.

A real-time clock is an unusual feature in a machine like this. With it the user can key in a future appointment, and have the machine alert him for the appointment at the proper time and date. Or the computer can store the time to run a program in its battery-backed-up CMOS (Complimentary Metal Oxide Semiconductor) memory, wake itself up at that time and run the program. As Jim Fremont, product manager for the HP-75C computer, says, “The HP-75C is so power-efficient it doesn't even have an on-off switch. The user simply calls it to various states of attention.” While the machine is running that program, it can call on files that have been previously stored, including program, appointment and data files, all of which can interact with each other.

The BASIC language is built into the machine's ROM, so users can program the HP-75 for their specific applications. But HP also has (as of September 15) software solution “books” available. The initial books include



The HP-75C hand-held computer is truly portable thanks to its size (10 by 5 by 1.25 inches) and its data-retention capabilities.

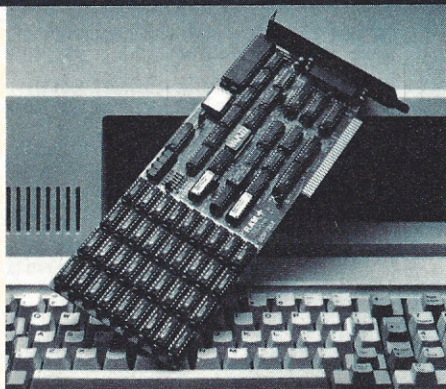
First we made IBM's baby grow up. Now we've made it think faster.

**Only RAM+ from Seattle Computer gives your IBM-PC
up to 256K of memory, the versatility of a built-in RS-232 serial port
plus the speed of Flash Disk™ software.**

Seattle Computer announces a major programming innovation for the IBM Personal Computer.

Our new RAM+ Flash Disk software lets you use memory like a disk. Flash Disk finds information in a flash by electronically simulating a disk drive 10 to 50 times faster than a mechanical disk. By copying your most-used programs and data to Flash Disk, you make them instantly accessible—ending those long disk access delays. Flash Disk is also ideal for temporary intermediate files.

And best of all, Flash Disk comes free with the RAM+ memory cards. Or, if you already own RAM+, Flash Disk software is available from our dealer.



As always, the beauty of RAM+ is the combination of memory and serial port on a single card. Not only does it save the \$150 an IBM serial card would cost, but it also leaves an open slot for further additions—like another RAM+ card.

Available in 64K, 128K, 192K or 256K, RAM+ is expandable, fast and reliable. Each card comes fully tested and with a one-year guarantee. (Expansion kits are also available.)

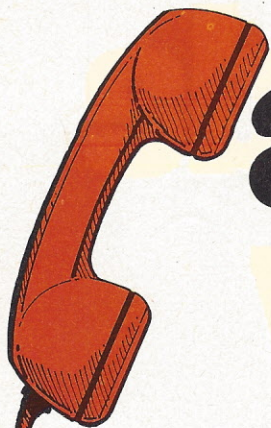
Of course it's made by Seattle Computer. We're the people who wrote the operating system of the IBM-PC, and we're still first in innovation.

How to order: New RAM+ with Flash Disk is available through your local computer store. Call us toll-free at **1-800-426-8936** for the location of your nearest RAM+ dealer.



**SEATTLE
COMPUTER**

1114 Industry Drive, Seattle, Washington 98188



asap COMPUTER HOTLINE

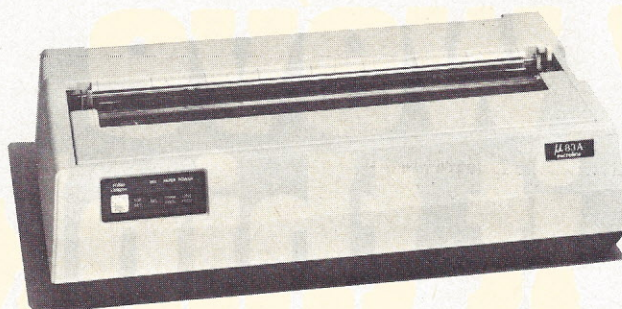
800-421-7701

OKIDATA PRINTERS

82A	80-column	Call
83A	136-column	Call
84AP	136-column, parallel	Call
84AS	136-column, serial	Call
	Oki Graph 1	\$40.00

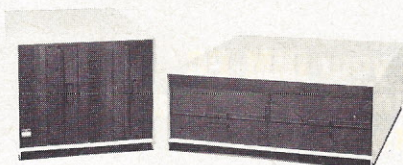
INTERFACES & CABLES

OKI-1	2K serial buffer	\$109.00
AEI-1	Parallel interface	\$ 40.00
AEC-1	Cable to Apple	\$ 19.95
AEC-2	Cable to Atari	\$ 19.95
RSC-2	RS-232 cable	\$ 25.00
TRSE-1	Cable to TRS-80	\$ 18.95



DRIVE CABINETS*

CAB8H	2 Drive, 8" horizontal	\$260.00
CAB8V	2 Drive, 8" vertical	\$275.00
CAB8V/	2 Drive, Shugart or Qume 8" with	
COMB04	2 Drive, Shugart or Qume 8" with	
	10-slot motherboard	\$475.00



X5	Desktop mainframe, small power supply	\$210.00
800D	Desktop mainframe, standard power supply	\$255.00
CAB5V	1 Drive, Shugart or Qume 5 1/4"	\$ 75.00

*All cabinets come complete with power supply, fan & internal cables.

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE. CALL FOR BEST PRICE.

Ordering information: name, address, phone; ship by: UPS or Mail. Shipping charge: add \$2.90 up to 1 lb. (UPS blue), U.S. Mail add \$1.50 (U.S. only) (\$25.00 minimum order).

SUBSYSTEMS*

CAB5V/1Q	Single cabinet with Qume DT-5	\$ 375.00
CAB8H/V+1S	Dual cabinet with Shugart 801R	\$ 690.00
CAB8H/V+2S	Dual Cabinet with (2) Shugart 801R	\$1,065.00
CAB8H+1M	Dual horizontal cabinet with (1) Mitsubishi 8"	\$ 665.00
CAB8H+2M	Dual horizontal cabinet with (2) Mitsubishi 8"	\$1,125.00
CAB8H+1Q	Dual horizontal cabinet with (1) Qume DT-8	\$ 735.00
CAB8H+2Q	Dual horizontal cabinet with (2) Qume DT-8	\$1,220.00
CAB8V+1Q	Dual vertical cabinet with (1) Qume DT-8	\$ 750.00
CAB8V+2Q	Dual vertical cabinet with (2) Qume DT-8	\$1,235.00
CAB8V+1M	Dual vertical cabinet with (1) Mitsubishi 8"	\$ 680.00
CAB8V+2M	Dual vertical cabinet with (2) Mitsubishi 8"	\$1,140.00

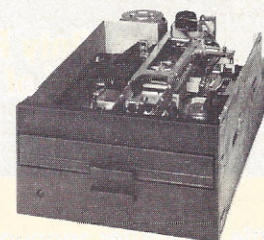
*All subsystems assembled & tested.

Terms: We accept cash, check, money orders, Visa and Master Charge (U.S. funds only). Tax: 6% Calif. res., 6 1/2% L.A. County. COD's and terms available on approval (School PO's Accepted).

DISK DRIVES*

MITSUBISHI

Mitsubishi M2894-63	8" double-sided, double-density	\$435.00
Mitsubishi M4853	5 1/4" 96 TPI, 1MB	Call for price
Mitsubishi M4854	5 1/4" double-sided, 1.5 MB	Call for price



Qume DT-5	ANSI 5 1/4" compatibility	\$295.00
Qume DT-8	IBM compatibility	\$465.00
Shugart 801	Standard floppy	\$400.00
Shugart 850	Double-sided floppy	\$600.00

*All drives include user manual.

asap
computer
products, inc.

1198 E. Willow St. Signal Hill, CA 90806
(800) 421-7701 • (213) 595-6431 • (714) 891-2663

ASAP COMPUTER PRODUCTS LTD.

116 Viceroy Road, D-12 Concord, Ontario
L4K1A9 Canada (416) 738-0500 (800) 268-1996

HARDWARE OF THE MONTH

finance/investment; real estate; math I, II and III; input/output (needed with the available modem) statistics; electrical engineering; and games. The company will introduce a graphics solution book early in 1983. The solution books will be available on either cassette tape for the cassette drive that's an available option, or on the magnetic cards for the pull-through reader. Software will also be available in ROM packs in early 1983, and this software will cover other application areas. Such application modules will cost about \$150, the company says, while the solution books will cost \$10 each.

Also available early next year will be what HP calls "core" software—that which is useful to all computer owners. This includes graphic presentation software, electronic spreadsheets, file management, memo writing, data communications and personal time management. They will all be available in plug-in ROM.

The computer can work alone, in a briefcase system, or on a desk top where it can interface with many different peripherals, such as printers, plotters and video monitors.

A briefcase system includes a digital cassette tape drive, a thermal printer/plotter and an acoustic modem.

The HP-75C hand-held computer is priced at \$995. It should be available now from HP and its dealers.

FOR MORE INFORMATION: Inquiries Manager, HEWLETT-PACKARD CO., 1820 Embarcadero Rd., Palo Alto, CA 94303.

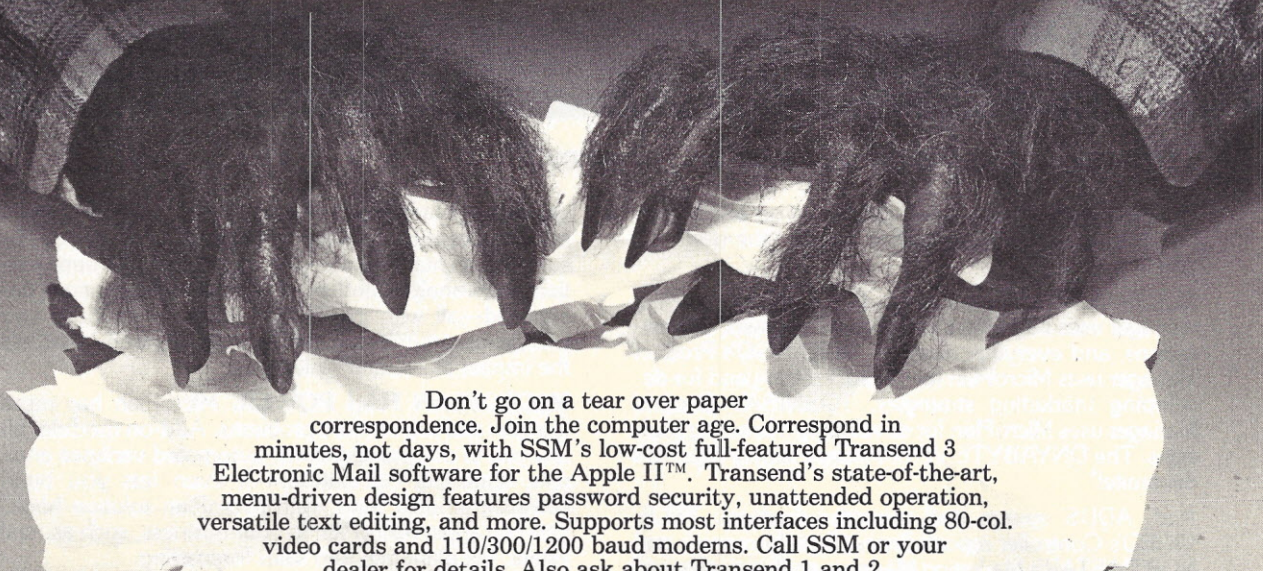
STRETCH TRAINING AND MARKETING DOLLARS

Trying to train your people faster and more effectively? Looking for another way to test market response for a new product? Reactive Systems, Inc. has the answer. The firm has just introduced the Voter 30, a hardware/software package which links up to 30 participants to a single Apple II computer.

"Voter 30 turns your Apple II computer into a group response system," says Laird Kelly, president of Reactive Systems. "A classroom of participants can respond to multiple choice questions and instructor and participants all see the results immediately."

Each participant uses a hand-held keypad to record

Correspondence isn't so hairy with Transend 3 Electronic Mail.



Don't go on a tear over paper correspondence. Join the computer age. Correspond in minutes, not days, with SSM's low-cost full-featured Transend 3 Electronic Mail software for the Apple II™. Transend's state-of-the-art, menu-driven design features password security, unattended operation, versatile text editing, and more. Supports most interfaces including 80-col. video cards and 110/300/1200 baud modems. Call SSM or your dealer for details. Also ask about Transend 1 and 2.

Apple II is a registered trademark of Apple Computer, Inc.



The Transformation People.



SSM Microcomputer Products, Inc.
2190 Paragon Drive, San Jose, CA 95131
(408) 946-7400, Telex: 171171

microplanTM

the electronic worksheet for CP/M[®] users.

AUTOMATIC
WHAT-IF

ROW 1 (Net Sales) <--
ENTER COMMAND:

MODE=NORMAL ORDER=R/O ROW=1-50

Available
for CP/M 86

ROW	First Quarter	Second Quarter	Third Quarter	Fourth Quarter		
1	1,000.0	1,100.0	1,210.0	1,331.0	4,641.0	44
2	450.0	489.5	532.4	579.0	2,050.9	45
3	200.0	220.0	242.0	266.2	928.2	46
4	300.0	350.0	400.0	450.0	1,500.0	47
5	950.0	1,059.5	1,174.4	1,295.2	4,479.1	48
6	50.0	40.5	35.6	35.8	161.9	49
7	5.0	3.7	2.9	2.7	3.5	50
8	0.0	0.0	0.0	0.0	0.0	51
9	0.0	0.0	0.0	0.0	0.0	52
10	45.0	44.5	44.0	43.5	0.0	53
11	0.0	0.0	0.0	0.0	0.0	54
12	0.0	0.0	0.0	0.0	0.0	55
13	0.0	0.0	0.0	0.0	0.0	56
14	0.0	0.0	0.0	0.0	0.0	57
15	0.0	0.0	0.0	0.0	0.0	58
16	0.0	0.0	0.0	0.0	0.0	59
17	0.0	0.0	0.0	0.0	0.0	

BUILT-IN REPORT
GENERATOR

ELECTRONIC
WORKSHEET

COMMAND
MENU

"The best piece of software . . . ever!"

The industry is buzzing with comments on MicroPlan. Users have supplied unqualified quotes "the best . . . ever."

ALTOS COMPUTERS agrees. The ALTOS budgeting manager uses MicroPlan for revenue forecasts, consolidations, and everyday analysis. DURANGO's Product Manager uses MicroPlan for product pricing and for developing marketing strategies. TOSHIBA's General Manager uses MicroPlan for developing marketing strategies. The DNYABYTE VP of Finance simply says, "it's dynamite!"

And, ADDS' system staff maintains budgets; TELE-VIDEO's Controller reports financial performance; and NORTH STAR's Marketing Manager analyzes sales—all in MicroPlan.

MICROPLAN IS EASY TO USE. You don't type; so MicroPlan is designed for no typing ease. You don't think in formulas; so MicroPlan is designed for pushbutton ease. You are not a programmer; so MicroPlan eliminates all the computerese that makes life difficult.

MICROPLAN SOLVES PROBLEMS. MicroPlan lets

you solve your problems electronically. You enter values into the electronic worksheet. MicroPlan handles all the sums, percentages and ratios. Even complex depreciation, loan analysis and present value computations are supplied—all with pushbutton ease. And when you change one number, MicroPlan automatically analyzes the impact of "what-if" questions.

MICROPLAN HAS POWER. MicroPlan has more features and solves more problems. Add-on modules allow you to do consolidations, automated variance analysis, statistical calculations—it even lets you build complex models. And, with MicroPlan solution books you can apply MicroPlan to your business, such as, real estate, tax planning, and sales forecasting.

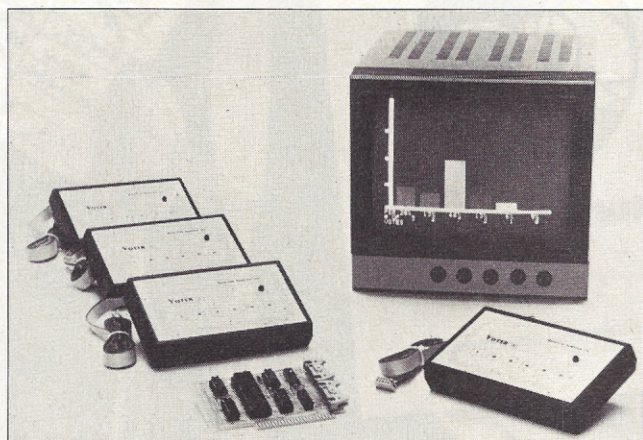
Call on your dealers. Find out why people are saying "MicroPlan is the best . . . ever!"

MicroPlan is available exclusively through local dealers. For more information, contact: Chang Laboratories, 10228 North Stelling Road, Cupertino, CA 95014; (408) 725-8088.

CP/M is a Registered Trademark of Digital Research.

HARDWARE OF THE MONTH

answers to the questions which are then projected onto a screen, usually via slides. After the participants answer



VOTER 30 transforms an Apple II personal computer into a group-response system for up to 30 people.

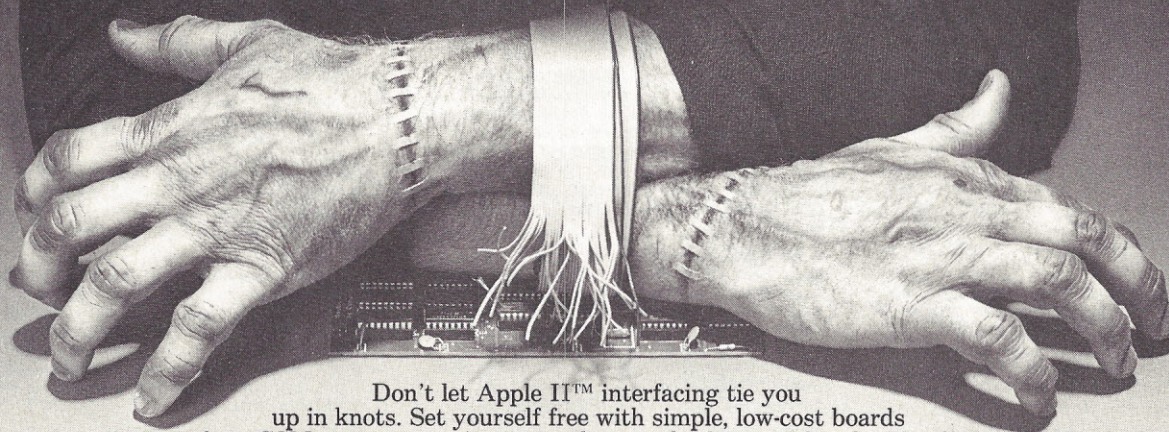
each question, Voter 30 tabulates the results and produces a bar chart of the responses onto a video screen. Hard copies of the results can also be made.

Voter 30 is useful for testing and market research applications because it keeps track of both individual and group responses. The system comes equipped with BASIC language programs designed to help those without programming skills write quizzes and retrieve and analyze test results. Diagnostic software will confirm whether the system is installed correctly.

"As a training aid, Voter 30 is extremely flexible," says Kelly. "It keeps people actively involved in training sessions by requiring each to answer throughout the period. The system also saves training time by helping the instructor to pinpoint the specific areas in which the trainees need more work. In addition, Voter 30 works in conjunction with other educational software, random video systems and multiple video displays. Polling stations can be ordered in any quantity to fit a company's needs."

(continued on page 206)

AppleTM interfacing doesn't have to be a monstrous hassle.



Don't let Apple IITM interfacing tie you up in knots. Set yourself free with simple, low-cost boards from SSM to connect printers, modems and other peripherals. We offer serial, parallel, multi-function interfaces, IEEE 488 controllers, clock cards and more. Just plug in and go. Two-year warranty and money-back guarantee if not satisfied. Call us or your dealer and ask about the hassle-free interfaces from SSM.

Apple and Apple II are trademarks of Apple Computer, Inc.



The Transformation People.



SSM Microcomputer Products, Inc.
2190 Paragon Drive, San Jose, CA 95131
(408) 946-7400, Telex: 171171

SOUTHWESTERN DATA SYSTEMS

PROUDLY INTRODUCES ONE OF THE TASTIEST MACHINE LANGUAGE DEVELOPMENT SYSTEMS AVAILABLE...

"THE S-D-S COMBO!"



Whether you're an experienced machine language programmer, or a beginner just learning, Southwestern Data Systems now offers you some of the best programming aids available...

Assembly Lines: The Book

By Roger Wagner

A BEGINNER'S GUIDE TO 6502 PROGRAMMING ON THE APPLE II.

For beginners, ASSEMBLY LINES: THE BOOK provides a clear and non-technical introduction to machine language programming on the Apple. Drawn from the monthly column in Softalk Magazine, and expanded to provide even more information, ASSEMBLY LINES: THE BOOK has already received critical acclaim as the best tutorial on machine language programming available.

Example programs include, paddles, sound, disk files and more; all presented with the novice programmer in mind. The book also includes an excellent reference section listing each machine language command, and a sample listing illustrating its most common uses in actual source listing.

SUGGESTED RETAIL PRICE: \$19.95

Merlin

By Glen Bredon

A 6502 MACRO ASSEMBLER

For programmers of all skill levels, we think you'll find that MERLIN is the most powerful 6502 assembler available for the Apple, while at the same time being the easiest to use.

IN FACT, WE'RE SO CONFIDENT OF THIS CLAIM, THAT IF YOU CAN FIND A BETTER ASSEMBLER WITHIN 30 DAYS OF PURCHASE, SIMPLY RETURN THE COMPLETE MERLIN PACKAGE FOR A FULL REFUND!

A full featured macro assembler with optional assembly to disk, and use of 'include' files, Merlin's editor has word processor-like power with such options as global search/replace, a powerful line editor, and more. The package also includes SOURCEROR, a utility to generate labeled pseudo source code from raw binary files, and also SOURCEROR.FP, a fully labeled and commented source listing of Applesoft BASIC!

SUGGESTED RETAIL PRICE: \$64.95

munch-a-bug™

By Wink Saville

A 6502 PROGRAM DE-BUGGER

To round out the set, we also highly recommend MUNCH-A-BUG. This very useful utility provides the means to trace through machine language programs one step at a time. This is very educational to the beginner, and an invaluable de-bugging aid to the advanced programmer. In addition, the same money-back guarantee applies to MUNCH-A-BUG as to MERLIN!

More than a simple step and trace utility, MUNCH-A-BUG includes its own mini-assembler, supports labels, and even conditional trace flags. This means M.A.B. can be put in a 'dormant' state, which will later 'pop-up' in the trace mode, only when certain conditions are met. Thus routines within fully operational programs can be tested right at run-time.

SUGGESTED RETAIL PRICE: \$49.95

SPECIAL LIMITED TIME COMBINATION PRICE: \$119.95

THIS OFFER VALID THROUGH OCTOBER 31, 1982. • CALIFORNIA RESIDENTS ADD 6% SALES TAX.

Please ask your local Apple dealer for more details, or write SDS for a sample list of MERLIN's commands and a complete product guide of over 20 other outstanding programs!

*MERLIN is the assembler of choice of these leading software companies: ARTSCI, INC. • BRODERBUND SOFTWARE, INC. • GEBELLI SOFTWARE, INC. • PROMETHEUS PRODUCTS, INC. • SIRIUS SOFTWARE, INC. • SYNERGISTIC SOFTWARE.

southwestern data systems™

P.O. BOX 582 • SANTEE, CALIFORNIA 92071 • TELEPHONE: 714/562-3670

A Fast, Easy, Inexpensive Approach to Word Processing

NEW

PIE Writer: Word Processing System

Hayden is thinking about your future. We know you're concerned with saving time and money . . . with increasing efficiency and productivity . . . and that is the reason for PIE Writer!

Now you can turn your Apple II into a complete word processing system. PIE Writer, a powerful editor and formatter, offers the versatility and machine efficiency of the larger systems—at a fraction of the cost!

Now all your documents and correspondence—reports, memos, direct mail pieces, even “personalized” form letters—can be composed, edited, formatted, and printed quickly and accurately. Simple keystroke commands let you alter characters, words, sentences, even entire paragraphs!

Take a look at some of PIE Writer's powerful new features:

- Incremental Spacing—adds fractions of space between words for text justification.
- Fast page scrolling.
- Call command—allows access to machine language subroutines.
- Saves formatted output on disk file.
- Works with 40 or 80 column display boards.
- Word Tabbing—cursor stops at beginning of every word, in addition to set stops.
- Tab stops can be saved on file.
- Word Delete—deletes entire words at a time.
- Lower case capabilities.
- Prints **BOLD**.
- Centers.

**All this and more . . .
for only \$149.95!**

Upgrade your PIE 2.0: Send \$75.00, check or money order, and original disk (at sender's risk) for upgraded version.

Learning to use PIE Writer is as easy as learning to type. There are many user-oriented features, designed for first-time users as well as serious programmers: an easy-to-understand, indexed instruction manual, a carefully designed reference card, an interactive tutorial with each diskette, a “help” screen listing key command descriptions for reference as text is edited, and an easel binder for at-a-glance aid.

If you're looking for high-quality at a low cost, PIE Writer is your best investment. Order yours today!
12009, Standard; 13409, Smarterm,
Sup'R'Term, Videx



Available at your local
computer store

or order direct;

1-800-631-0856

in New Jersey 201-843-0550, ext. 382

Hayden

Mail Dept. #PC 02 • Hayden Book Company, Inc.
To: 50 Essex Street • Rochelle Park, NJ 07662

Please accept my order and send me the PIE Writer System
for the following display board.

Please ☐ 40 column ☐ 80 column
Check: (#12009) (#13409)
☐ My money order for \$149.95 is enclosed; or
☐ Please charge my ☐ Visa ☐ MasterCard

Name _____

Address _____ Apt. _____

City _____

State _____ Zip _____

MasterCard/Visa# _____ Expires _____

Signature _____

Residents of NJ and CA must add sales tax.

PC10182-004 A503

HARDWARE OF THE MONTH

(continued from page 203)

The Voter 30 interface card with all programs and manual is \$595. Polling stations are \$125 each and include cable and connectors.

FOR MORE INFORMATION: REACTIVE SYSTEMS, INC., 40 N. Van Brunt St., Englewood, NJ 07631; (201) 568-0481.

ADD COLOR TO YOUR APPLE PRINTOUTS

Interactive Structure Inc.'s PKASO ID12-Color interface is compatible with both Apple II and Apple III personal computers, and offers text and graphics in full color when interfaced with IDS Color Prism printers.

The interface allows full snapshot dump of any text or graphics screen image, 16-level gray scale printing, user-created or software-defined printing characters, and SuperRes graphics using the dot resolution of the printer.

Other features include: hi-res and lo-res screen prints using accurate screen colors; quick commands to swap and rearrange the color set for maximum readability; quick commands to change printing colors, even within

word processor text; and quick commands to create and print with definable sets of colors.

The PKASO ID12-Color is compatible with most popular languages such as BASIC, Pascal and CP/M. An Apple III package is available making full use of the computer's expanded graphics and changeable character fonts.

The ID12-Color comes complete with cable, instructional diskette and comprehensive manual. The ID12-Color Apple II costs \$195 and the ID12-Color Apple III is priced at \$225.

FOR MORE INFORMATION: INTERACTIVE STRUCTURES INC., 146 Montgomery Ave., Bala Cynwyd, PA 19004; (215) 667-1713.

GENERATE GRAPHICS WITH YOUR APPLE

The Strobe 100 Graphics System can now be used to generate all imagery produced by the Apple Business Graphics software package. The user is now able to perform curve fitting and trend line analysis, produce multi-

YOUR COMPUTER WILL WORK WITHOUT PROPER CARE ... FOR AWHILE



A few microscopic particles of dust, smoke, oxide, or other contaminants can cause dirty read/write heads. Contaminated read/write heads can mean processing errors, lost data, or even a major repair bill.

That's why leading computer and disk drive manufacturers (Xerox, Radio Shack, Hewlett-Packard, Data General, Burroughs and over 35 other companies) suggest end-user preventative maintenance using the head cleaning kit from Innovative Computer Products.

Don't put off necessary preventative maintenance...use PerfectData™ Computer Care Products from Innovative, the key to trouble-free processing.

Available at leading retail computer stores and computer supply dealers.

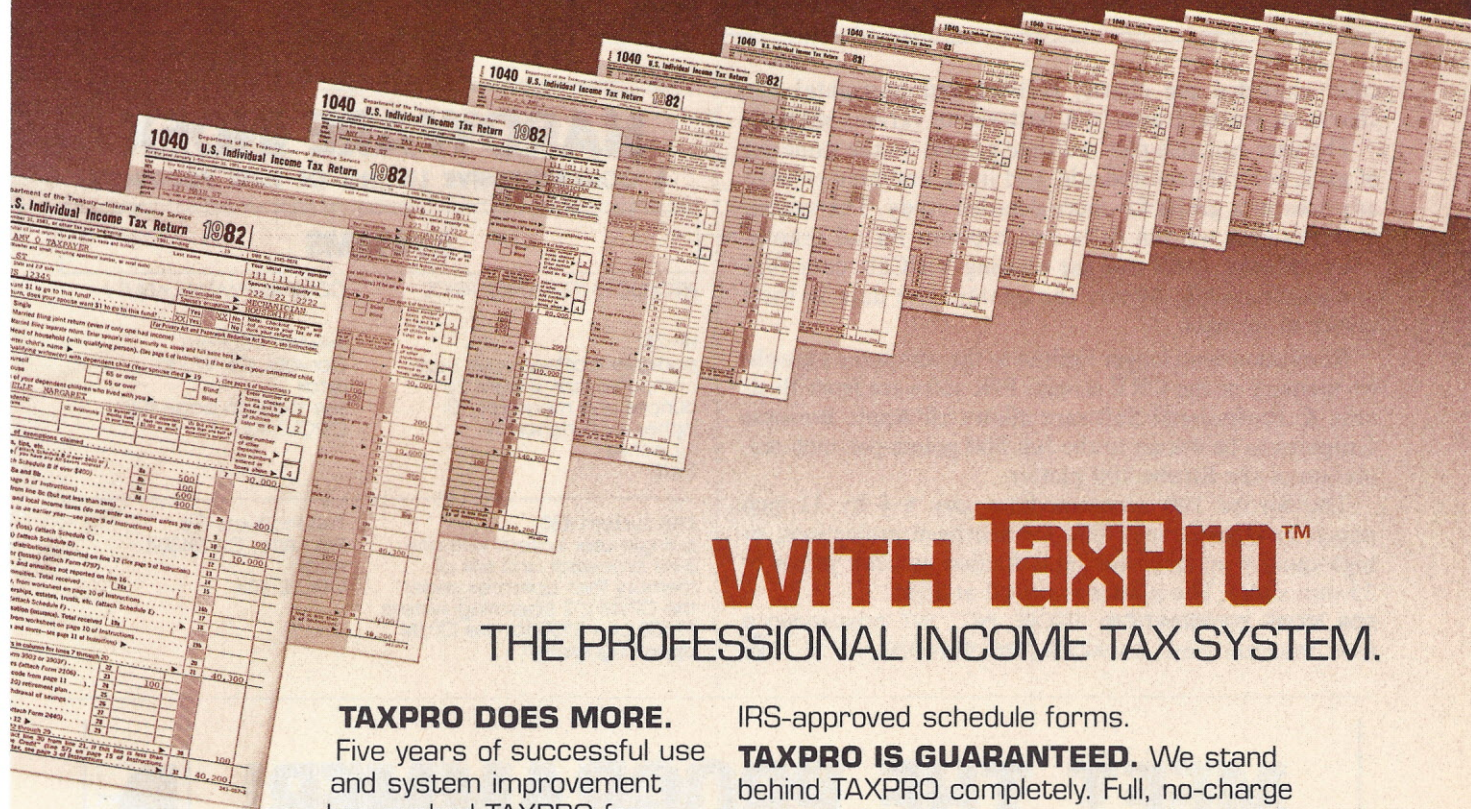


PerfectData™
COMPUTER CARE PRODUCTS

INNOVATIVE
COMPUTER PRODUCTS

18360 Oxnard Street, Tarzana, California 91356 (213) 996-4911/TWX 910-493-5964

INCOME TAX OFFICES: MULTIPLY YOUR OUTPUT.



WITH TaxPro™

THE PROFESSIONAL INCOME TAX SYSTEM.

TAXPRO DOES MORE.

Five years of successful use and system improvement has pushed TAXPRO far beyond Form 1040 and its

supplemental schedules. This versatile system also totals W-2s, computes FICA overpayment, calculates tax alternatives . . . even prepares client billing.

TAXPRO IS INTELLIGENT. It analyzes the client's tax picture, suggests the best route to go. Determines eligibility for special forms such as minimum/maximum tax, income averaging, to name a few.

TAXPRO IS EASY.

Because it follows the tax forms line by line. Taxes are automatically figured, entered everywhere they apply. Change any entry, and all relevant data is automatically revised. Produces a printout that exactly fits 1040 and

IRS-approved schedule forms.

TAXPRO IS GUARANTEED. We stand behind TAXPRO completely. Full, no-charge support through the tax season. Inexpensive, yearly system updates. Over 5 million returns prepared with no reported errors.

TAXPRO BUILDS PROFITS. The door is open to higher profits than you have ever enjoyed. Double, triple, or quadruple your output; pay for TAXPRO **and** the computer in one tax season.

If you do income tax returns, you need TAXPRO, the truly professional, computerized income tax preparation system.

Look into it today.
Contract Services
Associates,
706 South Euclid,
Anaheim,
California 92802,
(714) 635-4055.

45-PAGE DESCRIPTIVE
SYSTEM MANUAL: \$7.50



CONTRACT SERVICES ASSOCIATES

Improving the bottom line.

CIRCLE 127

HARDWARE INDEX

color exploded pie charts, vertical and horizontal bar charts, or scattergrams (dot patterns in various shapes).

The user can also plot multiple graphs on the same set of axes, control axes and add grid lines, and even enlarge any area of a graph for more detailed study. The system also produces written titles and captions for all graphs.

In addition, users can use existing VisiCalc data files and automatically display the quantitative data in their choice of formats.

Resolution is no longer limited to the computer's graphics memory or the CRT screen. PIK software from Business & Professional Software allows all Apple Business Graphics to be drawn to the full 500 points-per-inch resolution of the Strobe 100 plotter.

The Strobe 100 accommodates any 8 1/2 by 11-inch paper, or transparency film for overhead projections, or high-quality material for reproduction as color prints or 35 mm slides. The plotter is priced at \$785.

FOR MORE INFORMATION: STROBE, INC., 897 Independence Ave., Mountain View, CA 94043; (415) 969-5130.



HARDWARE INDEX

A COMPREHENSIVE LISTING OF NEW PRODUCTS

SYSTEMS

PRODUCTS/FEATURES/PRICE

COMPANY/AVAILABILITY

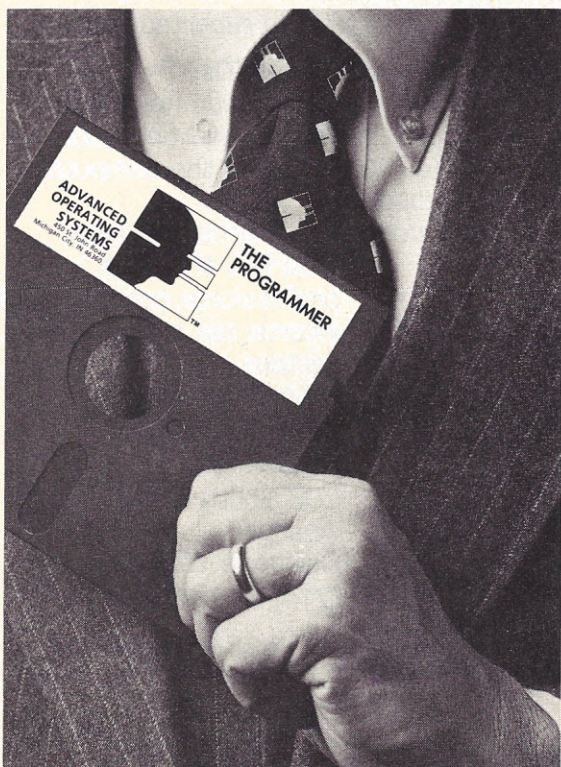
HP-75C
portable, battery-operated
computer that weighs 26
ounces and measures 10
inches by 5 inches by
1 1/2 inches
\$995

Hewlett Packard
Corvallis, OR 97330
retail
see story on page 198
CIRCLE 400

TAB System 830
a single-user system with one
8-bit processor and 64k of
memory that operates under
the CP/M 2.2 operating system
\$7500 plus \$150 for the CP/M
operating system

TAB Products Co.
Palo Alto, CA 94304
retail
CIRCLE 401

MEET THE PROGRAMMER!



If you can't find a business software package that does everything you need, or if you want to custom design specialty programs for your business ... MEET THE PROGRAMMER.

THE PROGRAMMER is a BASIC-language program generator which is powerful and highly-versatile, yet easy to use.

It does everything but actually create program ideas ... those come from you. But THE PROGRAMMER can implement your ideas by writing the appropriate lines of BASIC.

You control THE PROGRAMMER by choosing various functions from a series of "menus". When you've finished a program, save it on another disk for future use, and begin creating again.

THE PROGRAMMER comes with a complete instruction book which clearly explains how to create programs for almost any application.

If you're tired of buying software that just can't do the job ... meet THE PROGRAMMER. The solution to all of your business software problems.

THE PROGRAMMER works with the Apple II Plus® (48K Applesoft® or 64K CP/M®) and the IBM Personal Computer®. Get THE PROGRAMMER at your local software retailer, or call (800) 348-8558 to order. (Indiana residents, call (219) 879-4193). MasterCard and VISA accepted.

THE PROGRAMMER \$495.

ADVANCED OPERATING SYSTEMS
450 St. John Road, Michigan City, IN 46360

Apple II Plus, Applesoft are registered trademarks of Apple Computer, Inc.
IBM Personal Computer is a registered trademark of International Business Machines, Inc.
CP/M is a registered trademark of Digital Research, Inc.

OF ALL THE THINGS YOU BUY, HOW MANY ARE GOOD ENOUGH TO BE WARRANTED 5 YEARS?

Few disks stand the test of time. Because few are built to the precision standards or certified to the critical levels of Omni's complete line.

Each Omni disk is rated for 12 million passes without disk-related errors or significant wear. Each is certified error-free at a minimum of twice the error-

threshold of your system. And built to exceed all industry specifications including those of ANSI, ECMA, ISO and virtually every drive manufacturer. So you can count on them for the long haul. We guarantee it.

Call toll-free (800 343-7620) for your nearest dealer. In Mass., call 617 799-0197.

Omni Resources, 4 Oak Pond Ave., Millbury, Mass. 01527

Dealers. Software houses.

Check our prices, services and specifications. We offer duplicating, formatting, private labeling, small minimums, fast delivery and copy protection schemes on disks for virtually any system.



**THE DISK GOOD ENOUGH
TO BE WARRANTED 5 YEARS**

CIRCLE 122

HARDWARE INDEX

TAB System 1630
a single-user system with a 16-bit processor and 128k of memory capable of communication with a host computer and connection of a serial printer
\$7785 plus \$250 for the CP/M operating system

TAB Products Co.
Palo Alto, CA 94304
retail
CIRCLE 402

TAB System 1650
a multiple-user, 16-bit system with 128k of memory organized on a shared logic basis
\$9800 plus \$650 for the MP/M-86 operating system

TAB Products Co.
Palo Alto, CA 94304
retail
CIRCLE 403

MASS STORAGE

HARD DISK DRIVES

CAMEO 1000 Series
high capacity subsystems that offer from 10 megabytes to 160 megabytes of on-line data to your system
\$5995

Cameo Electronics Inc.
Anaheim, CA 92802
retail
CIRCLE 404

HD05-SN005 Data Storage Extender

ThoughtWorks
Phoenix, AZ 85019

designed specifically to operate with, and increase the data storage capability of the Sanyo MBC-3000D small business computer
\$2995, 5 Mbyte; \$3465, 10 Mbyte; \$3950, 16 Mbyte

retail
CIRCLE 405

18 MB Hard Disk Retrofit
designed to replace its standard 5.25-inch minifloppy disks, it expands available external memory from 215k to 18k per port
\$3995

PolyMorphic Systems
Santa Barbara, CA 93117
retail
CIRCLE 406

Hobbyist
a 5.25-inch hard disk designed to work with the Apple II, Apple III and IBM Personal Computer
\$1995

Santa Clara Systems, Inc.
Campbell, CA 95008
retail
CIRCLE 407

Interstellar Drive
provides a fast mass storage device which speeds up any scientific, educational or business program requiring disk access
\$1095

Pion Inc.
Arlington, MA 02174
retail
CIRCLE 408

(continued on page 215)

THE SINCLAIR ZX81

Programming for Real Applications

Randle Hurley

Here are 11 fully documented programs which will cast away any beliefs that the Sinclair ZX81 is too small for any real programming work.

These programs not only work, they are true work horses—doing real jobs in a variety of environments. Designed to run with the 16K memory module; the programs listed include a bulk storage program, word processor, financial applications, banking uses, plus educational programs. Software is available on cassette, and can be ordered from the back of the book. Programs will also run on the Timex Sinclair.

ISBN 0-88056-090-8

166 pages

\$9.95

New titles from dilithium Press

How to Use Supercalc®

PET® Basics

How to Build a Program

dilithium Press
P.O. Box 606
Beaverton, OR 97075



- ☒ Yes, Please send me the Sinclair ZX81 by Randle Hurley. I understand I may return it for a full refund if I am not satisfied.
- ☐ I enclose \$9.95 plus \$1 to cover shipping and handling.
- ☐ Or call our toll free number 1-800-547-1842 to charge your order on Visa or M/C.

Name _____

Address _____

City, State, Zip _____

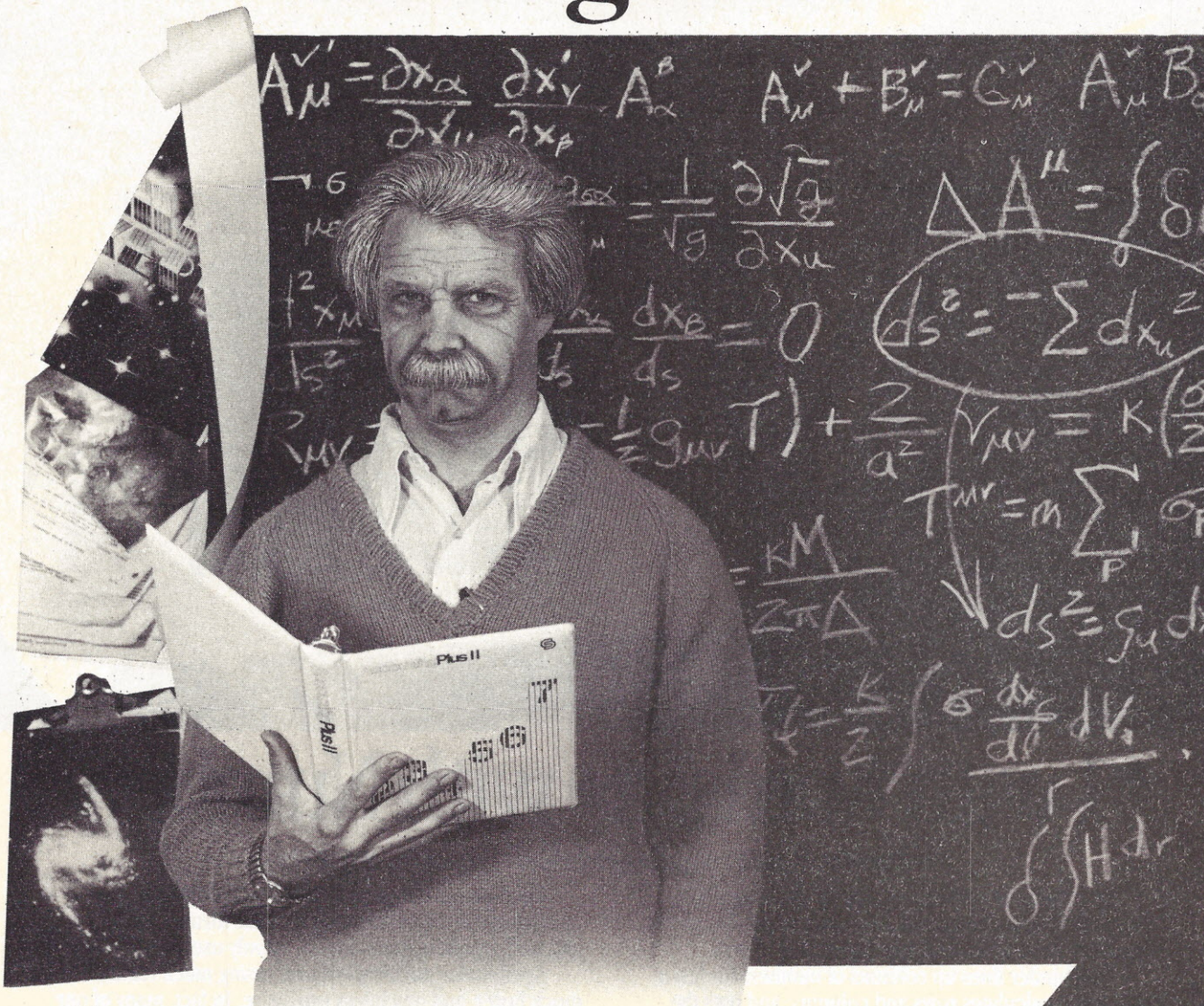
Mail to: dilithium Press, P.O. Box 606, Beaverton, OR 97075

☐ Please send me your free catalog—
Brainfood



Accounting Plus II

It Figures



It figures that the same people who brought you Accounting Plus* on the larger computer systems wouldn't forget the Apple.** Accounting Plus II brings to the Apple Computer a completely integrated, easy to use accounting system. Accounting Plus II doesn't require any special hardware, only 48K of RAM and two floppy drives or hard disk, and you don't have to be a CPA to use it. Accounting Plus II organizes and streamlines your paper flow and generates checks, invoices, statements and purchase orders on pre-printed forms. The system supports a solid audit trail which your business requires and your accountant demands.

Modules now available:

- General Ledger
- Accounts Receivable
- Accounts Payable
- Inventory with purchasing

For additional information call or write
Systems Plus Inc., 3975 East Bayshore,
Palo Alto, CA 94303 Phone 415/969/7047

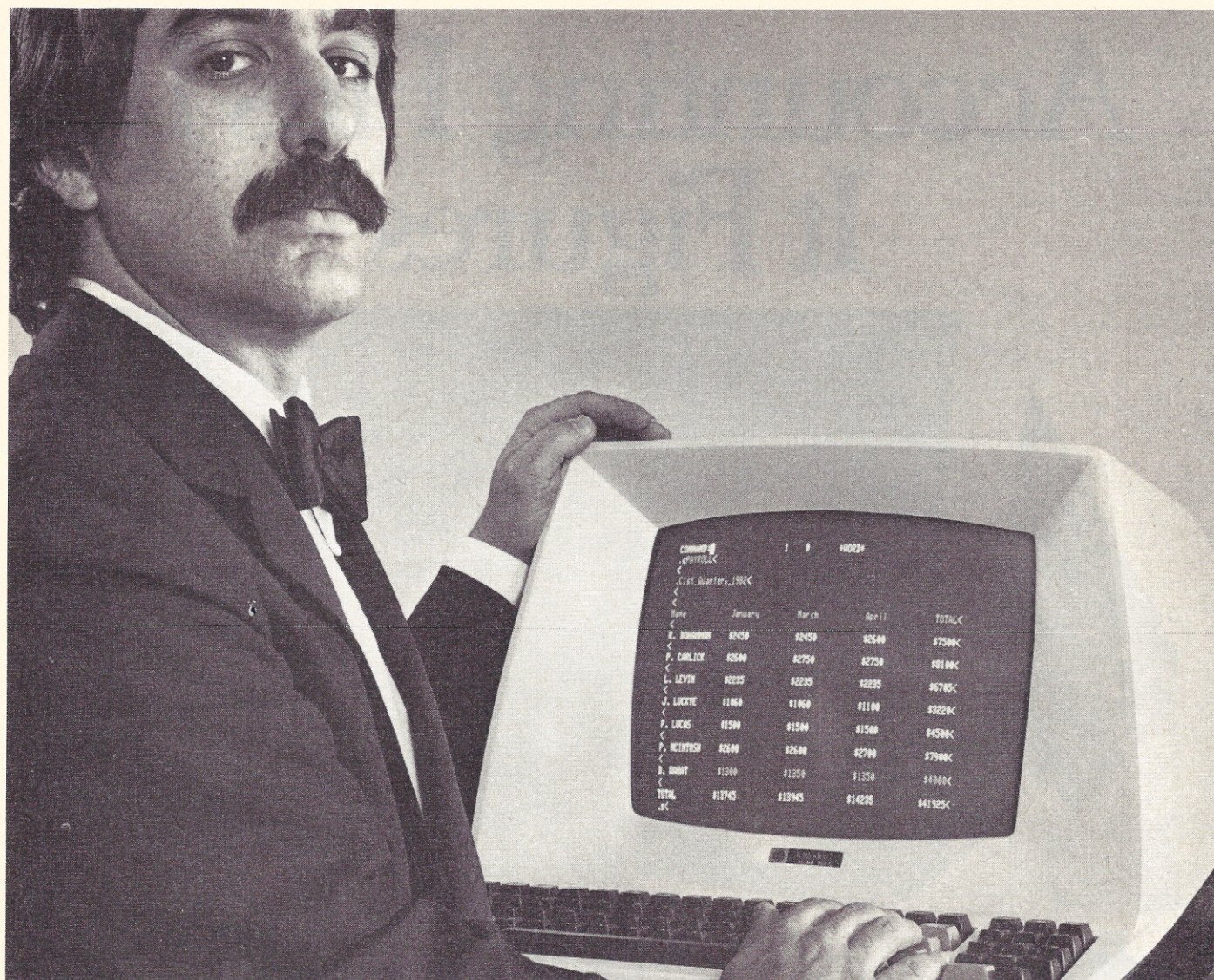
Seeing is believing.

Systems Plus



*TM of Software Dimensions, Citrus Heights, CA

**TM of Apple Computers, Cupertino, CA



#1 with Words. A+ with Numbers.

Spellbinder Word Processing and Office Management Software.

Spellbinder processes words *and* numbers.

So you save time and improve accuracy in any document: Financial statements. Budgets. Reports. Invoices.

Spellbinder lines up columns of numbers for faster data entry; calculates rows and columns; and puts the totals where you want them.

Spellbinder performs a number of mathematical functions, such as addition, subtraction, and multiplication; extends figures (for example, *6 dictionaries @ \$12.35 = \$74.10*); adds tax to invoices; and displays convenient reference tables.

You can edit numbers within a column, or move a column to a different location. Spellbinder's integrated forms handler saves time and manpower on multiple invoices, reports, and other documents.

The software for discriminating users.

Whether you process numbers or words, you'll appreciate Spellbinder's unrivalled ease-of-use and superior capabilities. Spellbinder and an inexpensive microcomputer easily outperform *dedicated* word processing systems costing *up to three times* more.

IBM is a registered trademark of IBM Corporation.

Spellbinder features flexible printing options; mass mailing and legal text capabilities; plus forms handler and boiler plate features for commonly used documents.

Spellbinder makes word processing much easier, much faster, and much less expensive. In fact, many of our users convert from some of the better known (and more costly) systems.

You should be just as discriminating. See your nearest dealer for a demonstration of Spellbinder. Or call Lexisoft at (916) 758-3630.

Now available in 8086 and IBM® Personal Computer format.

Spellbinder
 Spellbinder Word Processing
 and Office Management System.

A product of Lexisoft, Inc.

Box 267, Davis, CA 95616 □ (916) 758-3630

Wizard peripheral cards add magic to your micro

The Wizard of Wesper is creating the finest microcomputer plug-in peripherals. When you're ready to add marvels to *your* micro, know that those of the Wizard come from WESPER, the world's largest independent manufacturer of computer peripherals (mini and micro)... and that Wespermicro Systems is the microcomputer division.

The Wizard commands powers far far greater than those found in lesser kingdoms! His engineering knowledge spans decades. His production occupies acres. His inspectors are legion. His support to users is copious. And his service extends to the farthest border. You can inspect all of the Wizard's peripherals at your fine computer store.

WIZARD-80 (for Apple II)*

Instant 80-Column Card

Lets you see exactly what you will get when typing/editing 80-column format. Displays upper/lower case. Compatible with most word processors, micro-modems, prom-programmers and all current Apple II expansion boards.

\$295.00

WIZARD-16K (for Apple II)

16K RAM Apple Memory Card

Adds 16K bytes of RAM. Compatible with Z-80 cards for CP/M. Runs with all Apple languages.

\$140.00

WIZARD-BPO (for Apple II)

Buffered Printer Output Card

Parallel printer interface that allows new-task input while old task prints out. Contains 16K byte "Character Buffer" expandable to 32K bytes.

\$179.00

WIZARD-SOB (for Apple II)

Serial Output Buffer Card

Serial printer interface that allows input of new task during old-task printout. Features are same as Wizard-BPO but for use with serial (letter quality, etc.) printers.

\$249.00

WIZARD-Spooler (for IBM PC)**

Full Feature Spooler Card

Parallel printer interface. 16K buffer with 32K or 64K optional. Lets you input new tasks while old task is being printed.

\$285.00



SUBSIDIARY OF WESPERCORP

Telephone (800) 854-8737
(714) 850-1666



CIRCLE 181

*Registered trademark of Apple Computers Inc.

**Registered Trademark of IBM.

MICRO



BUSINESS WORLD INC.
Information Line (213) 996-2252
TOLL FREE MAIL ORDER LINES
(800) 423-5886 Outside Calif.

HP HEWLETT
PACKARD

HP83

LIMITED
QUANTITY
MSL
2250.00

\$795.00
Save 1455.00

SPECIAL OF THE MONTH

Put a **Genie** In Your Computer Intelligent Printer

Interface Card

Works With

- Integer Basic
- Applesoft*
- Pascal 1.0 & 1.1
- CP/M**

*Applesoft is a registered trademark of Apple Computer, Inc.
**CP/M is a registered trademark of Digital Research.



OUR PRICE
\$119.00

MSL 159.00
Save 40.00



MICRO-SCI APPLE II+ COMPATIBLE DRIVE

W/ CONTROLLER	W/O CONTROLLER
MSL 549.00	MSL 449.00
OUR PRICE	OUR PRICE
\$429.00	\$379.00

Save COMPARE TO
216.00 APPLE DRIVE

Save COMPARE TO
146.00 APPLE DRIVE

APPLE IS A REG. TRADE MARK OF APPLE COMPUTER



IBM PERSONAL COMPUTER

INCLUDES:
2 Drives
Colour Graphic Board
64K Memory

CALL FOR PRICE
*Subject to availability



TPI SMITH CORONA DAISY WHEEL PRINTER

Letter
Quality

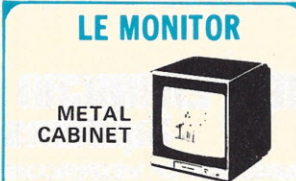
OUR PRICE
MSL 895.00
\$599.00
Save 296.00



CASIO FX9000P PERSONAL COMPUTER

POWERFUL
CA-BASIC

NEW
AND C/MOS-RAM
MSL 995.00
OUR PRICE
\$599.00
Save 396.00



LE MONITOR
METAL
CABINET

9" GRN. PHS. MONITOR
12" GRN. PHS. MONITOR
1 Yr. Warranty

MSL 189.00
OUR PRICE
\$119.00
Save 70.00



**APPLE II
PLUS
48K**
*Subject to
availability
CALL FOR PRICE
APPLE IS A REG. TRADEMARK OF APPLE COMPUTER



**FRANKLIN
BUSINESS
SYSTEM**
Franklin Ace 100 system • 64K •
Disk Drive with controller card • 12"
green phs. video monitor.

\$1695.00
SAVE \$1000 COMPARED TO
APPLE SYSTEM



**VIC 20
EXPANSION**
OUR PRICE
MSL 229.00
\$189.00
Save 40.00

FEATURES:
• 7 expansion slots
• All aluminum construction
• Large power supply
with toroidal trans-
former • 5 volt supply
direct of the VIC 20
for cooler operation • 24
volt supply for the Arlon
Micro VIC Printer •
Detachable cover protects
cartridges • Houses VIC
and Expansion in one
portable unit • Holder
for RF modulator • Sup-
ports all VIC 20 cartrid-
ges from Arlon, Micro,
Commodore and others



**AXIOM
DOT MATRIX
GP 100**
8 1/2" wide paper
MSL 389.00
OUR PRICE
\$269.00
Save 120.00



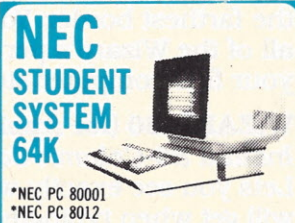
HP 125
OUR PRICE
MSL 2750.00
\$1975.00
Save 775.00

DUAL MASTER DRIVE
MSL 2500.00
OUR PRICE
\$1595.00
Save 905.00

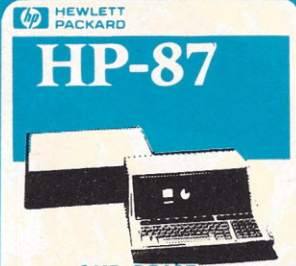


XEROX 820
WORD PROCESSING SYSTEM
(INCLUDES SOFTWARE)

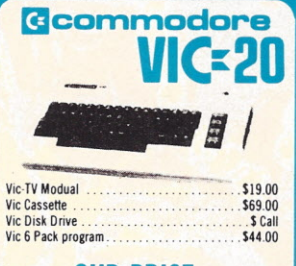
MSL 3495.00
OUR PRICE
\$2649.00
Save 846.00



**NEC
STUDENT
SYSTEM
64K**
*NEC PC 80001
*NEC PC 8012
*NEC PC 8031
12" Grn. PHS. Video Monitor
MSL 2839.00
OUR PRICE
\$2095.00
Save 744.00



HP-87
MSL 2495.00
OUR PRICE
\$1749.00
Save 746.00



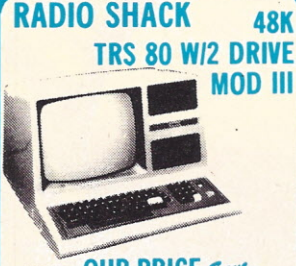
**commodore
VIC-20**
Vic TV Modul \$19.00
Vic Cassette \$69.00
Vic Disk Drive \$ Call
Vic 6 Pack program \$44.00
MSL 299.00
OUR PRICE
\$235.00
Save 64.00



EPSON
INCLUDES
GRAFTRAX
MX 80 645.00
MX 80FT 745.00
MX 100 995.00
OUR PRICE
\$429.00
\$535.00
\$669.00
Save 216.00
210.00
326.00



**commodore
STUDENT
SYSTEM**
4032 - 32K 40 COL CRT
4940 - DUAL DISK DRIVE
MSL 2590.00
OUR PRICE
\$1978.00
Save 612.00



**RADIO SHACK 48K
TRS 80 W/2 DRIVE
MOD III**
MSL 2495.00
OUR PRICE
\$1799.00
Save 696.00

**1 Year Extended
WARRANTY**
\$99.00
INQUIRE

**AVINGS
ERVICE
LECTION
ATISFACTION**

**MICRO BUSINESS WORLD
WAREHOUSE**
18720 Oxnard, #108
Tarzana, CA 91356

OUTSIDE CA CALL TOLL FREE 1 (800) 423-5886 IN CA (213) 996-2252

Telex: 182852
Answer: MICKO TZNA

*California residents add 6% sales tax.
**Add 3% Shipping & Handling - Add
3% surcharge for credit cards. Orders
cannot be shipped unless accompanied
by payment, including shipping, hand-
ling and tax where applicable.

Name (Please print) _____
Address _____
City _____ State _____ Zip _____

Qty	Make	Model	Description	Price	Total

TOTAL ORDER \$ _____
TAX IF APPLICABLE* _____
SHIPPING & HANDLING** _____
TOTAL ENCLOSED \$ _____

Certified Check or M.O. Allow 2 weeks clearance for
Bank Wire Transfer personal check

CREDIT CARD # _____
Exp. Date _____

Signature _____

VISA MasterCard

BMC • CENTRONIC • NEC • HAZELTINE • AMPEX • VERBATIM • HITACHI • HAYDEN • CANON • NOVATION • D.C. HAYS MICROCOMPUTERS • PAPER TIGER • PERSONAL SOFTWARE • GTE • HP • D.C. HAYS MICROCOMPUTERS • PAPER TIGER • GTE • DIABLO • BMC • CENTRONIC • NEC • HAZELTINE • MEMOREX • AMPEX • PERSONAL SOFTWARE • ADDS • XEROX • DIABLO

HARDWARE INDEX

(continued from page 210)

FLOPPY DISK DRIVES

Bering 4895 consists of 5 $\frac{1}{4}$ -inch Winchester drive and an 8-inch floppy drive packaged in a desktop or rack-mountable enclosure \$6700

Bering Industries Inc.
San Jose, CA 95112
retail
CIRCLE 409

CMA 1600-IBM series of 8-inch disk drive subsystems designed for the IBM Personal Computer \$1750

Columbia microSystems Inc.
Columbia, MO 65201
retail
CIRCLE 410

Interface Floppy Disk Drives expanded disk drive storage for the TRS-80 from \$215

Interface Inc.
Canoga Park, CA 91304
retail
CIRCLE 411

CR-5500 Monochrome Display Monitor features a non-glare, 12-inch green phosphor screen \$245

Comrex International Inc.
Torrance, CA 90505
retail
CIRCLE 412

CR-6500 Color Display Monitor features a 13-inch in-line color picture tube for sharp color graphics and a built-in speaker with audio circuit \$445

Comrex International Inc.
Torrance, CA 90505
retail
CIRCLE 413

CR-6600 Color Display Monitor features a sharp RGB signal for a higher resolution than composite signals and crisp, clear color graphics \$599

Comrex International Inc.
Torrance, CA 90505
retail
CIRCLE 414

TELEX 279 Model 4 features a 14-inch diagonal, non-glare smear resistant screen and offers users a detachable keyboard with over 30 layouts \$4250

Telex Computer Products
Tulsa, OK 74135
retail
CIRCLE 418

PRINTERS/PLOTTERS

Strobe 100 prints graphics produced with either the Apple II or Apple III computers directly \$785

Strobe Inc.
Mountain View, CA 94043
see story on page 206
retail
CIRCLE 417

DMP-29 eight-pen plotter that features heightened performance and firmware attributes \$1995

Bausch & Lomb
Instruments & Systems
Division
Austin, TX 78761
retail
CIRCLE 415

Olympia ESW 3000 letter-quality printer that features laser-sharp print quality, proportional spacing and a choice of ribbon systems under \$2000

Olympia USA Inc.
Somerville, NJ 08876
retail
CIRCLE 416

TERMINALS FROM TRANSNET

PURCHASE PLAN • 12-24 MONTH FULL OWNERSHIP PLAN • 36 MONTH LEASE PLAN

	DESCRIPTION	PURCHASE PRICE	12 MOS.	24 MOS.	36 MOS.
* DEC	LA34 DECwriter IV Forms Ctrl.	\$1,095	\$105	\$ 58	\$ 40
	LA100 Letter Printer RO.	1,995	190	106	72
	LA120 DECwriter III KSR.	2,295	220	122	83
	LA120 DECwriter III RO.	2,095	200	112	75
	LA12A Portable DECwriter.	2,950	280	155	106
	VT100 CRT DECscope.	1,695	162	90	61
	VT101 CRT DECscope.	1,195	115	67	43
	VT125 CRT Graphics.	3,295	315	185	119
	VT131 CRT DECscope.	1,745	167	93	63
	VT132 CRT DECscope.	1,995	190	106	72
TEXAS INSTRUMENTS	VT18XAC Personal Computer Option	2,395	230	128	86
	TI745 Portable Terminal.	1,595	153	85	58
	TI765 Bubble Memory Terminal.	2,595	249	138	93
	TI940 CRT.	1,795	173	96	65
	TI785 Portable KSR, 120 CPS.	1,795	173	96	65
	TI787 Portable KSR, 120 CPS.	2,195	211	117	80
LEAR SIEGLER	TI810 RO Printer.	1,695	162	90	61
	TI820 KSR Printer.	2,195	211	117	80
	ADM3A CRT Terminal.	595	57	34	22
C-ITOH	ADM5 CRT Terminal.	645	62	36	24
	ADM32 CRT Terminal.	1,165	112	65	42
	CIT-101 CRT.	1,525	147	82	55
TELEVIDEO	CIT-161 Color CRT.	2,675	257	143	97
	CIT-427 Color Graphic CRT.	3,095	297	165	112
	910 CRT Terminal.	650	62	36	24
NEC SPINWRITER	925 CRT Terminal.	850	82	46	31
	950 CRT Terminal.	1,075	103	57	39
	Letter Quality, 7715 RO.	2,695	259	144	98
GENERAL ELECTRIC	Letter Quality, 7725 KSR.	3,195	307	171	115
	2030 KSR Printer 30 CPS.	1,195	115	67	43
	2120 KSR Printer 120 CPS.	2,195	211	117	80
EPSON	MX-80 F/T Printer.	745	71	42	27
	MX-100 Printer.	895	86	48	32
TIMEPLEX	E0400 4 Channel Stat Mux.	1,525	147	82	55
	E0800 8 Channel Stat Mux.	2,050	197	110	74

*DEC is the trademark of Digital Equipment Corporation

FULL OWNERSHIP AFTER 12 OR 24 MONTHS • 10% PURCHASE OPTION AFTER 36 MONTHS

MICROCOMPUTERS

APPLE • COMMODORE • HP87 • DEC

ACCESSORIES AND PERIPHERAL EQUIPMENT

ACOUSTIC COUPLERS • MODEMS • THERMAL PAPER • RIBBONS • INTERFACE MODULES • FLOPPY DISK UNITS



TRANSNET CORPORATION
1945 ROUTE 22 • UNION, N.J. 07083 • (201) 688-7800
TWX 710-985-5485 800-526-4965 OUTSIDE N.J.

CIRCLE 128

POCKET COMPUTER NEWSLETTER

A NEWSLETTER FOR POCKET COMPUTER USERS

This timely, compact publication provides up to the minute information on pocket computers, including models such as the Radio Shack TRS-80 PC-1 and PC-2, Sharp Electronic's PC-1500 and PC-1211, and others as they are announced. Subscribe now to receive a valuable bonus absolutely FREE!

■ Up to the Minute News ■ Product & Equipment Reviews
■ Important Operating Tips ■ Practical Programs ■ More
By Subscription Only: for a calendar year period (January – December). You get all issues published to date for the calendar year in which you subscribe, at the time you subscribe.

MC/VISA Phone Subscriptions: (203) 888-1946

- ☐ I am interested. Please send me more information. I have a:
- ☐ Radio Shack PC-2 ☐ Sharp PC-1500 ☐
- ☐ 1982 Regular Subscriber (Issues 11 – 20). \$30.00 in U.S. (U.S. \$36.00 to Canada. U.S. \$45.00 elsewhere.)
- ☐ 1982/83 Subscriber (Issues 11 – 30). \$60.00 in U.S. (U.S. \$72.00 to Canada. U.S. \$90.00 elsewhere.)
- ☐ 1983 Regular Subscriber (Issues 21 – 30). \$36.00 in U.S. (U.S. \$42.00 to Canada. U.S. \$50.00 elsewhere.)

Orders must be accompanied by payment in full. We do not issue invoices for the POCKET COMPUTER NEWSLETTER.

Thank you for your remittance.

Name: _____

Addr: _____

City: _____ State: _____ Zip: _____

MC/VISA #: _____ Expires: _____

Signature: _____

POCKET COMPUTER NEWSLETTER
P.O. Box 232, Seymour, CT 06483

CIRCLE 129

Computer Program Books for Beginners

Everything you need to start programming your own computer.

ATARI 400/800 Computers

101 ATARI Computer Programming Tips & Tricks, learn-by-doing instruction, hints, secrets, shortcuts, techniques, includes 101 ready-to-run programs, 128 pages \$8.95

31 New ATARI Computer Programs For Home, School & Office, practical type-n-run software, 96 pages \$8.95

ATARI Computer BASIC Coding Form, 40-sheet tablet with stiff back, makes writing programs, fun, easy \$2.95

TIMEX 1000/Sinclair ZX-81

101 TIMEX 1000/Sinclair ZX-81 Programming Tips & Tricks, secrets, hints, shortcuts, techniques, learn-by-doing instruction, 101 ready-to-run programs, 128 pages \$7.95

37 TIMEX 1000/Sinclair ZX-81 Computer Programs For Home, School & Office, useful type-n-run software, 96 pages \$8.95

TIMEX/Sinclair ZX-81 BASIC Coding Form, 40-sheet tablet with stiff back, makes writing programs easy \$2.95

APPLE Computer

101 APPLE Computer Programming Tips & Tricks, secrets, hints, shortcuts, techniques, includes 101 ready-to-run programs, 128 pages \$8.95

33 New APPLE Computer Programs For Home, School & Office, practical type-n-run software, 96 pages \$8.95

APPLE Computer BASIC Coding Form, 40-sheet tablet with stiff back, makes writing software fun, easy \$2.95

TRS-80 Color Computer

101 Color Computer Programming Tips & Tricks, learn-by-doing instructions, hints, secrets, techniques, includes 101 programs, 128 pages \$7.95

55 Color Computer Programs For Home, School & Office, practical ready-to-run software, colorful graphics, 128 pages \$9.95

55 MORE Color Computer Programs For Home, School & Office, handy companion, packed with different useful type-n-run software, colorful graphics, 112 pages \$9.95

Color Computer Graphics, complete guide, how to make the most of Color Computer video graphics, many complete programs, 128 pages \$9.95

The Color Computer Songbook, 40 favorite pop, classical, folk, seasonal, type-n-run music programs to play on color computer, 96 pages \$7.95

Color Computer BASIC Coding Form, 40-sheet tablet with stiff back, makes writing software easy, fun \$2.95

TRS-80/Sharp/Casio Pocket Computers

99 Tips & Tricks For The New Pocket Computers, for PC-2/PC-1500, all new useful graphics & business/home/education software, 99 ready-to-run programs, 128 p \$7.95

Pocket Computer Programming Made Easy, fast new easy read-n-learn way to quickly understand BASIC, how to make PC-1/-2/PC-1211/-1500/FX-702P work for you, 128 p \$8.95

101 Pocket Computer Programming Tips & Tricks, secrets, hints, shortcuts, techniques, includes 101 type-n-run programs, for PC-1/PC-2/PC-1211/PC-1500, 128 pages \$7.95

35 Practical Programs For The CASIO Pocket Computer, useful type-n-run software for FX-702P, 96 pages \$8.95

Pocket Computer BASIC Coding Form, 40-sheet tablet with stiff back, makes writing programs a breeze \$2.95

Order direct from this ad. Send check, money order, or Mastercard or VISA account number and expiration date. Include \$1 shipping for each item ordered up to a maximum of \$3. Or write for our free catalog. Mail to:

ARCsoft Publishers

POST OFFICE BOX 132 G
WOODSBORO, MARYLAND 21798

(301) 663-4444



VISA

Customers wanting airmail send US \$4 postage per item ordered. Sorry, no COD.

HARDWARE INDEX

GRAPHICS

Management Briefing Graphics System
allows managers to turn raw numbers into colorful visuals for IBM Personal Computer
\$26,000 (includes software)

Centec Corp.
Reston, VA 22090
retail
CIRCLE 440

SPEECH

PR 2020 Speech Peripheral
a stand-alone electronic text-to-speech converter
from \$3500

TELESENSORY Speech Systems
Palo Alto, CA 94304
retail
CIRCLE 419

VOTAN Model V5000
integrates two major speech technologies: speaker dependent recognition and speech generation
\$5000

VOTAN
Hayward, CA 94545
retail
CIRCLE 420

VOTAN Model V4000
contains its own processing power, logic and memory
\$4200

VOTAN
Hayward, CA 94545
retail
CIRCLE 421

BOARDS

Interface No. 1
allows you to connect any printer with a Centronics-compatible parallel interface to your Atari 400/800
\$85

looking glass microproducts
Loveland, CO 80537
retail
CIRCLE 422

PKASO Interface
offers versatile ways to add intelligent text and graphics printing capabilities to the Apple II and Apple III
\$165

Interactive Structures Inc.
Bala Cynwyd, PA 19004
see story on page 206
retail
CIRCLE 423

VOTER 30
a hardware/software package which links up to 30 participants to a single Apple II computer
\$595

Reactive Systems Inc.
Englewood, NJ
see story on page 201
retail
CIRCLE 425

Slot 8
a card that plugs into slot seven and provides 2 slots for peripheral use
\$64.95

Legend Industries Ltd.
Pontiac, MI 48056
retail
CIRCLE 424

COMMUNICATIONS

Omnitac 7212
a Bell-licensed, FCC registered, direct-connect modem
\$575

Omnitac Data Inc.
Phoenix, AZ 84034
mail order
CIRCLE 426

CIRCLE 130

Smith Corona TP-1 TEXT PRINTER



\$599⁸⁸ UPS DELIVERED

- 120 words/min (12 cps) with full letter-quality
- Either parallel or RS-232C interfacing available (specify)
- 10 or 12 pitch (characters per inch) available (specify)
- Friction feed on 10 1/2" printable line; takes 4-part forms

Okidata Printers

MICROLINE 80	\$349 ⁸⁸
MICROLINE 82A	\$439 ⁸⁸
80/82A TRACTOR	\$59 ⁸⁸
MICROLINE 83A	\$694 ⁸⁸
OKIGRAPH ROM	\$44 ⁸⁸
RS-232C 2K BUFFER	\$159 ⁸⁸
MICROLINE 84 Parallel 200 cps	\$1044 ⁸⁸
MICROLINE 84 RS-232C 200 cps	\$1164 ⁸⁸

Anadex Printers

DP-9500A	\$1469 ⁸⁸
DP-9510A	\$1469 ⁸⁸
DP-9620A	\$1569 ⁸⁸

Brother Printers

DAISYWRITER 2000—Includes Parallel, RS-232C, IEEE488, & Current Loop Interfacing standard	\$1089 ⁸⁸
CABLES	\$49 ⁸⁸
TRACTOR	\$149 ⁸⁸

Centronics Printers

CENTRONICS 122	\$979 ⁸⁸
CENTRONICS 739 Parallel Interface	\$564 ⁸⁸
CENTRONICS 739 RS-232C Interface	\$679 ⁸⁸
739 COLOR OPTION	\$79 ⁸⁸

IDS Printers

PRISM 80	\$999 ⁸⁸
Includes Sprint Mode, Dot Plot, and Cut Sheet Guide	
PRISM 132	\$1699 ⁸⁸
4-Color Graphics, Sprint Mode, Dot Plot, and Cut Sheet Guide	

CALL FOR PRICES

On NEC Spinwriters, Qume & Diablo Daisywheels. QUANTEX, DATASOUTH, DIP, MPI and other printers available.

TEC Printers



DMP85

\$469⁸⁸

Generic version of NEC & Prowriter printers. Features 120 cps, bi-directional, logic-seeking, 1.3K buffer. 5 fonts, 8 sizes on 9x9 matrix, w/proportional print, true descenders, & Greek/Math font. 160 x 144 dots/inch Hi-Res graphics matrix, 1/144" line feed. Friction & tractor standard, rear paper path. Parallel only.

NEC PC-8023A-C	\$509 ⁸⁸
C.I.TOH PROWRITER	\$499 ⁸⁸
C.I.TOH PROWRITER Parallel & RS-232C	\$614 ⁸⁸
C.I.TOH PROWRITER 2	\$734 ⁸⁸
C.I.TOH PROWRITER 2 Parallel & RS-232C	\$794 ⁸⁸
F-10/40 STARWRITER 40cps Parallel or RS-232C	\$1499 ⁸⁸
F-10/55 PRINTMASTER 55cps Parallel or RS-232C	\$1799 ⁸⁸
F-10 TRACTOR	\$289 ⁸⁸

Cables & interfaces available for the Apple, Atari, CBM/Pet, IBM PC, Osborne and TRS-80s

Hayes Smartmodem

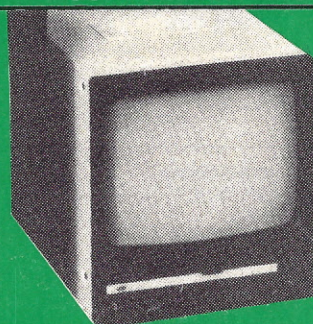


HAYES SMARTMODEM	\$229 ⁸⁸
HAYES 1200 BAUD SMARTMODEM	\$574 ⁸⁸

MODEMS

HAYES MICROMODEM II	\$299 ⁸⁸
SIGNALMAN MARK I	\$89 ⁸⁸
NOVATION AUTO CAT	\$224 ⁸⁸
NOVATION APPLE CAT	\$334 ⁸⁸
NOVATION 1200 BAUD AUTO CAT	\$569 ⁸⁸
NOVATION 1200 BAUD APPLE CAT	\$579 ⁸⁸

USI Pi Series



20 MHz bandwidth, 1000-line-at-center resolution, 80 columns by 24 lines—the USI Pi-3 with amber screen redefines quality. Amber makes any display easier to read all day, every day. Used by **THE BOTTOM LINE's** president, the USI Pi-3 Amber Monitor comes with his personal recommendation.

USI Pi-1 (9" Green)	\$164 ⁸⁸
USI Pi-2 (12" Green)	\$174 ⁸⁸
USI Pi-3 (12" Amber)	\$199 ⁸⁸
USI Pi-4 (9" Amber)	\$169 ⁸⁸

Amdek Monitors

AMDEK 300G 13"	\$179 ⁸⁸
AMDEK Color I	\$379 ⁸⁸
AMDEK Color II High Resolution RGB	\$799 ⁸⁸
AMDEK Color III (RGB)	\$499 ⁸⁸

Zenith Monitors

ZENITH ZVM-121 (12" green)	\$139 ⁸⁸
-------------------------------------	---------------------

IBM Products

Quadram

QUADBOARDS

Memory in 64K blocks (up to 256K), a centronics-compatible parallel I/O with hardware to an external port, an asynchronous RS-232C communications port (DB-25 male external), and a clock/calendar with on-board battery—all of this on one QUADBOARD. Exceptional quality & design leaving remaining IBM PC slots free for other applications

64K QUADBOARD	\$439 ⁸⁸
128K QUADBOARD	\$539 ⁸⁸
192K QUADBOARD	\$629 ⁸⁸
256K QUADBOARD	\$719 ⁸⁸
64K MEMORY CHIPS (PKG. 9)	\$99 ⁸⁸

QuCeS Inc.

Big Blue for the IBM PC features a Z80 microprocessor running at 5.5 MHz, 64K memory, a centronics-compatible parallel port, the RS-232C port, an on-board calendar/clock, & a hard disk interface.

BIG BLUE	\$519 ⁸⁸
QuCeS Hard Disk subsystems for the IBM PC.	
6mB HARD DISK	\$2489 ⁸⁸
12mB HARD DISK	\$2839 ⁸⁸
24mB HARD DISK	\$4229 ⁸⁸

Xedex

BABY BLUE	\$539 ⁸⁸
-----------------	---------------------

MicroSoft

64K RAMcard	\$274 ⁸⁸
64K MEMORY CHIPS (PKG. 9)	\$99 ⁸⁸

Maynard Electronics

FLOPPY DISK CONTROLLER	\$189 ⁸⁸
---------------------------------	---------------------

Tandon Drives

40 TRACK, 5S	\$229 ⁸⁸
40 TRACK, 10S	\$319 ⁸⁸

IBM PC Software

We carry a full line of IBM PC Software. Also Apple/Franklin software. Ask about our Software Society discounts.

Orders & Information: CALL (603)-673-8857

Orders Only: CALL (800)-343-0726

No Hidden Charges

No surcharge for credit cards—No charge for UPS shipping—Stock shipments next day
All equipment shipped factory fresh with manufacturer's warranty—We accept CODs
\$50 minimum per order—Open PO's not accepted
No foreign orders accepted

Prices subject to change—call for quotes

HIGH TECHNOLOGY AT AFFORDABLE PRICES

**THE BOTTOM
LINE**

Milford NH 03055-0423

HARDWARE INDEX

Serial I/O Board
enables an Apple II or Apple III
computer running CP/M to
communicate with remote
computers using bisynchronous
protocols
\$1195

IE Systems Inc.
Newmarket, NH 03857
retail
CIRCLE 427

TelexPlug
connects any computer or word
processor with the Western Union
telex network, as well as other
common carriers, so that users
may send and receive messages
directly through their word
processor or computer
\$1485

Teleface Corp.
New York, NY 10116
mail order
CIRCLE 428

TRS-80 DC-1200 High Speed
Direct Modem
features high speed 1200 baud
operation, to reduce time
charges for timesharing or
information retrieval services
\$699

Radio Shack
Fort Worth, TX 76102
retail
CIRCLE 429

FURNITURE

Ergonomic Electronic Environment
Keyboard Tables
with 3-way adjustable keyboard
support surfaces for detached
terminal keyboards
\$298

Marvel Metal Products Co.
Chicago, IL 60632
mail order
CIRCLE 430

Modular Computer Systems Work
Center
provides room for a monitor,
keyboard, disk drives and a
printer
\$149.95

O'Sullivan Industries Inc.
Lamar, MO 64759
retail
CIRCLE 431

Modular Printer Stand
accommodates most large
printers with 18 gauge steel
support rails
\$149.95

O'Sullivan Industries Inc.
Lamar, MO 64759
retail
CIRCLE 432

Software at Affordable Prices!

We'll match any advertised price on the items that we carry. If you find a lower price within 30 days of purchase, show us the ad and we'll refund the difference.

BUSINESS

APPLE II * II +

Continental*
Home Accountant \$ 55

Howard Software*
82 Tax Preparer \$115
State CA/ILL/NY/NJ \$ 60
Others 20% Off

On-Line Systems*

The Gen. Mgr. \$120
Screenwriter II \$ 99
The Dictionary \$ 70
Expediter II + \$ 94
Others 25% Off

Software Publishing*

PFS II \$ 95
Reports II \$ 69
*Graph \$ 95
PFS III \$145
Reports III \$ 99

Stoneware*

DB Master \$160
Pak #1, #2, Stat ea. \$ 80

IBM * APPLE * CP/M

Accounting Plus*
Gen. Ledger
Acc. Receivable

Acc. Payable
Inventory

*2 modules \$550
*3 modules \$650 \$1130
*4 modules \$699 \$1375
*Additional ea. \$ 348

Ashton-Tate*

*dBase II

IBM Apple CP/M
\$455 \$460

Datamost*

Tax Beater \$ 99
R.E.A.P. \$ 99
Write-On
II, III, IBM PC \$ 99 \$ 99

Micropro*

*Wordstar \$229 \$197 \$229
*Mailmerge \$ 79 \$ 69 \$ 79
*Both \$299 \$259 \$299
Datastar \$168 \$195
Spellstar \$118 \$129
Calcstar \$118 \$159
Supersort I \$115 \$145
Wordmaster \$ 95
Others 33% Off

Sorcim*

Supercalc \$194 \$194 \$194
Superwriter \$277 \$277 \$277
Others 20% Off

VisiCorp*

*Visicalc 3.3 I (II,
IBM, 256 IBM) \$158 \$158
*Visifile 2 \$185
*Visitrend/Plot 3 \$215
*Visipack 1, 2, & 3 \$525
Visischedule II, III \$235
Others 25% Off

RECREATIONAL

APPLE * ATARI

Apple Panic \$ 20
David's Mid. Magic \$ 26
Star Blazer \$ 25
Track Attack \$ 23
Castle Wolfenstein \$ 23
Snack Attack \$ 22
Thief \$ 25
Casino \$ 34
*Jawbreaker \$ 20
Mouskattack \$ 26
Crossfire \$ 24
Threshold \$ 31
Galactic Attack \$ 24
Wizardry P.G. \$ 40
Wizardry K. of D. \$ 28

Sirius Software*

Snake Byte \$ 24
Twerps \$ 24
Gorgon \$ 32
Sneakers \$ 24
Others 20% Off

Arcade Plus*

cassette disk
Ghost Hunter \$ 26 \$ 30
Pro Football \$ 26 \$ 30

34% OFF
*Special Items Discount

VISA-MASTERCHARGE
ORDERS ONLY
CALL COLLECT (313) 642-1454
ALL OTHER
INFORMATION (313) 644-8921



**THE
HAPPY COMPUTER**

DEPARTMENT # P 102
460 N. WOODWARD AVENUE
BIRMINGHAM, MI 48011
(313) 644-8921

*Sale prices are through October only!

FOR FAST DELIVERY

For fast delivery, send certified check or money order. Specify hardware manufacturer, operating system, cartridge/cassette/disk system and format. Personal or company checks require one to three weeks to clear. Outside continental U.S. - add \$10 plus air parcel post. Add \$3.50 postage and handling per each item. Blue label \$3.00 additional per item. Michigan residents add 4% sales tax. Mastercharge - Visa add 3% and include expiration date. Prices subject to change without notice. All items subject to availability.
* Mfrs. Trademark.

H & E COMPUTRONICS INC.

•• EVERYTHING FOR YOUR TRS-80™ • ATARI™ • APPLE™ • PET™ • CP/M™ • XEROX™ • IBM™ • OSBORNE™ ••

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp. • ATARI is a trademark of Atari Inc. • APPLE is a trademark of Apple Corp. • PET is a trademark of Commodore
• CP/M is a trademark of Digital Research • XEROX is a trademark of Xerox Corp. • IBM is a trademark of IBM Corp. • OSBORNE is a trademark of Osborne Corp.



BUSINESS PAC 100

100 Ready-To-Run Business Programs

★ All orders processed within 24-Hours
★ 30-Day money back guarantee

(ON CASSETTE OR DISKETTE).....Includes 128 Page Users Manual.....

Inventory Control.....Payroll.....Bookkeeping System.....Stock Calculations.....

Checkbook Maintenance.....Accounts Receivable.....Accounts Payable.....

BUSINESS 100 PROGRAM LIST

NAME DESCRIPTION

1	RULE78	Interest Apportionment by Rule of the 78's
2	ANNU1	Annuity computation program
3	DATE	Time between dates
4	DAYYEAR	Day of year a particular date falls on
5	LEASEINT	Interest rate on lease
6	BREAKEYN	Breakeven analysis
7	DEPRSL	Straightline depreciation
8	DEPRSY	Sum of the digits depreciation
9	DEPRDB	Declining balance depreciation
10	DEPRDDB	Double declining balance depreciation
11	TAXDEP	Cash flow vs. depreciation tables
12	CHECK2	Prints NEBS checks along with daily register
13	CHECKBK1	Checkbook maintenance program
14	MORTGAGE/A	Mortgage amortization table
15	MULTMON	Computes time needed for money to double, triple, etc.
16	SALVAGE	Determines salvage value of an investment
17	RRVARIN	Rate of return on investment with variable inflows
18	RRCONST	Rate of return on investment with constant inflows
19	EFFECT	Effective interest rate of a loan
20	FVAL	Future value of an investment (compound interest)
21	PVAL	Present value of a future amount
22	LOANPAY	Amount of payment on a loan
23	REGWITH	Equal withdrawals from investment to leave 0 over
24	SIMPDISK	Simple discount analysis
25	DATEVAL	Equivalent & nonequivalent dated values for oblig.
26	ANNUDEF	Present value of deferred annuities
27	MARKUP	% Markup analysis for items
28	SINKFUND	Sinking fund amortization program
29	BONDVAL	Value of a bond
30	DEPLETE	Depletion analysis
31	BLACKSH	Black Scholes options analysis
32	STOCVAL1	Expected return on stock via discounts dividends
33	WARVAL	Value of a warrant
34	BONDVAL2	Value of a bond
35	EPSEST	Estimate of future earnings per share for company
36	BETAALPH	Computes alpha and beta variables for stock
37	SHARPE1	Portfolio selection model i.e. what stocks to hold
38	OPTWRITE	Option writing computations
39	RTVAL	Value of a right
40	EXPVAL	Expected value analysis
41	BAYES	Bayesian decisions
42	VALPRINF	Value of perfect information
43	VALADINF	Value of additional information
44	UTILITY	Derives utility function
45	SIMPLEX	Linear programming solution by simplex method
46	TRANS	Transportation method for linear programming
47	EOQ	Economic order quantity inventory model
48	QUEJUE1	Single server queueing (waiting line) model
49	CVP	Cost-volume-profit analysis
50	CONDPROF	Conditional profit tables
51	OPTLOSS	Opportunity loss tables
52	FQOQOQ	Fixed quantity economic order quantity model
53	FQEOQSH	As above but with shortages permitted
54	FQEOQPB	As above but with quantity price breaks
55	QUEJUECB	Cost-benefit waiting line analysis
56	NCFANAL	Net cash-flow analysis for simple investment
57	PROFIND	Profitability index of a project
58	CAP1	Cap. Asset Pr. Model analysis of project

59	WACC	Weighted average cost of capital
60	COMPBAL	True rate on loan with compensating bal. required
61	DISCBAL	True rate on discounted loan
62	MERGANAL	Merger analysis computations
63	FINRAT	Financial ratios for a firm
64	NPV	Net present value of project
65	PRINDLAS	Laspeyres price index
66	PRINDPA	Paasche price index
67	SEASIND	Constructs seasonal quantity indices for company
68	TIMETR	Time series analysis linear trend
69	TIMEMOV	Time series analysis moving average trend
70	FUPRINF	Future price estimation with inflation
71	MAILPAC	Mailing list system
72	LETWRT	Letter writing system-links with MAILPAC
73	SORT3	Sorts list of names
74	LABEL1	Shipping label maker
75	LABEL2	Name label maker
76	BUSBUD	DOME business bookkeeping system
77	TIMECLK	Computes weeks total hours from timeclock info.
78	ACCTPAY	In memory accounts payable system-storage permitted
79	INVOICE	Generate invoice on screen and print on printer
80	INVENT2	In memory inventory control system
81	TELDIR	Computerized telephone directory
82	TIMUSAN	Time use analysis
83	ASSIGN	Use of assignment algorithm for optimal job assign.
84	ACCTREC	In memory accounts receivable system-storage ok
85	TERMSPAY	Compares 3 methods of repayment of loans
86	PAYNET	Computes gross pay required for given net
87	SELLPR	Computes selling price for given after tax amount
88	ARBCOMP	Arbitrage computations
89	DEPRSF	Sinking fund depreciation
90	UPSZONE	Finds UPS zones from zip code
91	ENVELOPE	Types envelope including return address
92	AUTOEXP	Automobile expense analysis
93	INSFILE	Insurance policy file
94	PAYROLL2	In memory payroll system
95	DILANAL	Dilution analysis
96	LOANAFDD	Loan amount a borrower can afford
97	RENTPRCH	Purchase price for rental property
98	SALELEAS	Sale-leaseback analysis
99	RRCONVBD	Investor's rate of return on convertible bond
100	PORTVAL9	Stock market portfolio storage-valuation program

- ☐ TRS-80 Cassette Version \$99.95
- ☐ TRS-80 (Mod-I or III), Pet, Apple or Atari Versions \$99.95
- ☐ TRS-80 Mod-II, IBM, Osborne and CP/M Versions \$149.95

ADD \$3.00 FOR SHIPPING IN UPS AREAS
ADD \$4.00 FOR C.O.D. OR NON-UPS AREAS
ADD \$5.00 TO CANADA AND MEXICO
ADD PROPER POSTAGE OUTSIDE OF U.S., CANADA AND MEXICO

COMPUTRONICS
MATHEMATICAL APPLICATIONS SERVICE™

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

ASK FOR OUR 64-PAGE CATALOG
DEALER INQUIRIES INVITED

**NEW TOLL-FREE
ORDER LINE**
(OUTSIDE OF N.Y. STATE)
(800) 431-2818



**24 HOUR
ORDER
LINE**



(914) 425-1535

ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE
DELIVERY SUBJECT TO AVAILABILITY

DON'T JUDGE A COMPUTER BY IT'S COVER!!!

- ...If you were to have a
**Microcomputer operating at
4MHZ**
- ...If you were to have a **5
Megabyte Hard Drive built in**
- ...If you were to have a **floppy
disk drive built in**
- ...If you were to have an **Amber
Phosphor Monitor built in**
- ...If you had the **finest Hard
Disk Operating System
available**

**You would have the New
B.T. 4x5 Model III
microcomputer, the only one
in its class.**

Starting with a basic TRS-80 Model III, add one Tandon 40 Track Dual Sided Disk Drive, 48K of High Grade NEC Memory, the famous Micro Mainframes Disk Controller System, and the security of B.T. Enterprises engineering assuring long life and dependability!

Then we really get started include a 4 MHZ Module installed to make the Model III Microprocessor operate at twice the speed of a standard Radio Shack Model III. Also include the use of a Superdense Disk Drive for extra Floppy disk storage (360K). Then have installed a 5 Megabyte Hard Disk Drive (Winchester Technology). When the system is configured, the Hard Disk Drive contains the operating system and becomes the master (primary) drive. The Hard Disk has 40 times the speed of data transfer as compared to a normal floppy disk as well as containing the storage capacity of more than 30 standard floppy disk drives.

Each unit is built and tested in our Long Island New York assembly plant and delivered to your dealer complete with a Dos Plus 4.0 Disk Operating System which we consider to have the finest features of any Hard Disk Operating System available.

Price:

\$3995.00

Add \$20.00 shipping and handling



171 Hawkins Rd.
Centereach, N.Y. 11720
(816) 981-8868 (voice)
(816) 888-8856 (modem)
Dealer Inquiries Welcome
Prices subject to change



N.Y.S. Residents Add Tax

Add \$2 shipping - handling
CIRCLE 133

HARDWARE INDEX

90° Corner Adapter
provides a sturdy work area of
shelf for extra equipment
\$44.95

O'Sullivan Industries Inc.
Lamar, MO 64759
retail
CIRCLE 433

PRO-TECH Locking Stand
secures any Apple II or Apple II
Plus, up to three disk drives and
any type or size monitor against
theft
from \$27.95

Segull Enterprises
Berkly, MA 02780
mail order
CIRCLE 434

MISCELLANEOUS

DATAGARD
AC line power conditioners
from \$49.95

SGL Waber Electric
Westville, NJ 08093
retail
CIRCLE 435

Disk-File
stackable, pull-drawer diskette
files
\$10.95

Weber & Sons Inc.
Adelphia, NJ 07710
mail order
CIRCLE 436

Disk-O-Tier
desktop holder for computer
diskettes
\$9.50

Electronic Time Service
Center
Willoughby, OH 44094
mail order
CIRCLE 437

Kraft Dual-Mode Joysticks
plug in joysticks for Apple II,
TRS-80 Color Computer and
IBM Personal Computer
from \$64.95

Kraft Systems Co.
Vista, CA 92083
retail
CIRCLE 438

Kraft Paddle Controls
paddle controls for the Apple II
\$49.95

Kraft Systems Co.
Vista, CA 92083
retail
CIRCLE 439

PerfectData
computer care products that
allow the end-user to extend the
life and improve the performance
of small systems hardware and
media
from \$5.95

Innovative Computer
Products
Tarzana, CA 91356
retail
CIRCLE 441

PLEXA-LOK
clear acrylic cover that
slips over the Apple II keyboard
and snaps into place
\$19.95

Last Electronics Quality
Computer Products
San Andreas, CA 95249
mail order
CIRCLE 442

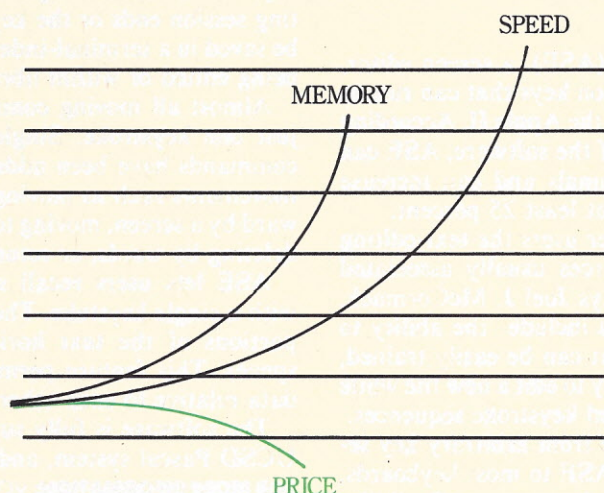
Surge Suppressor and
Noise Filter
effective in eliminating power
line induced disturbances which
cause component damage and
logic disruption to sensitive
electronic equipment
\$55

PANAMAX
San Rafael, CA 94903
mail order
CIRCLE 443

MORE MEMORY.

MORE SPEED.

LESS MONEY.



Hayden Applesoft Compiler Plus.

Speed is what you buy a compiler for. And no compiler runs faster in serious number-crunching than Compiler Plus, because no compiler offers its unique array-vector lookup technique.

But speed isn't all you get. With its DOS relocation software, Compiler Plus lets users with 16K RAM cards compile and execute larger programs using the added memory.

Wait, there's more. You can develop modular programs—with disk overlays, if you like—by taking advantage of Compiler Plus's ability to call compiled programs as subroutines. The compiler supports the sharing of variables between modules in a common data area. The library of runtime routines is fully relocatable, and you can load it anywhere in memory or include it as part of the compiled code.

Even that isn't all. Compiler Plus recognizes the broadest range of Applesoft keywords, including the "&" token. So interfacing with assembly language routines is easier.

By now, you think you're looking at an expensive bit of software. But you're wrong.

The Hayden Applesoft Compiler Plus is actually one of the lowest priced Applesoft Compilers available.

Speed, of course. Memory, too, and modularity and compatibility. All for less than you'd expect: just \$99.95.

One more reason to be glad you chose Apple—and Hayden.

Available from your local dealer or call:

1-800-343-1218

(in MA call 617-937-0200)

#19609, DOS 3.3 Applesoft in ROM necessary to relocate DOS

HAYDEN SOFTWARE

Productivity And Planning Software Debut For Business

Each month Personal Computing scans the software market to keep you up to date on everything that's new. Those products we consider to be most useful and exciting in this month's crop are described in this section and commended for your closer examination. Others are listed in the index.

DEFINE FUNCTION KEYS AND BOOST PRODUCTIVITY

The Advanced System Editor (ASE), a screen editor, provides user-definable function keys that can run on the IBM Personal Computer and the Apple II. According to Volition Systems, developers of the software, ASE can be adapted to a variety of terminals and can increase productivity at the keyboard by at least 25 percent.

"ASE brings personal-computer users the text-editing and program-development resources usually associated with much larger computers," says Joel J. McCormack, the company chairman. Features include the ability to edit large files, function keys that can be easily trained, file selection by a menu, the ability to edit a new file while still within another, and simplified keystroke sequences.

"Because all commands derive from arbitrary key sequences, it is easy to customize ASE to most keyboards, giving manufacturers and systems houses great flexibility in the choice of terminals," McCormack says. Because ASE comes with a separate configuration program, application developers can define the keys they want their users to have. This enables developers to redefine commands or capabilities to fit users' needs and applications.

The Advanced System Editor was designed specifically to improve productivity at the keyboard during program development and text editing. It incorporates user-oriented conveniences not usually found in personal-computer editors. "We included the features found on larger systems that we knew would speed work flow," McCormack says, "and we eliminated bottlenecks and sources of frustration."

The overall result has been to increase the capacity of files that can be edited, automate repetitive tasks, reduce keystrokes, and boost the capabilities of the editor so that memorization is minimized and almost all work can be done without extra manipulation outside the editor.

File handling has been simplified because the file size is limited by available disk space rather than by RAM memory size. With ASE, a single file may fill an entire disk volume, so users are not forced to juggle split files.

User-definable keys allow users to automate tasks that recur within their particular program development or text-editing environment.

Any sequence of keystrokes, including editor commands, can be "taught" to one of eight function keys. Once taught, pressing the function key, in effect, causes the same keystroke sequence to be repeated. The function key remembers the sequence it has learned until the editing session ends or the key is redefined. Definitions can be saved in a terminal-independent fashion within the file being edited or within libraries of definitions.

Almost all moving commands are accomplished with just one keystroke. Single-keystroke cursor-positioning commands have been added to permit additional cursor movements such as moving word by word, moving backward by a screen, moving to the beginning or end of a line, deleting by words, or returning to the home position.

ASE lets users recall search or replacement strings with a single keystroke. The editor also allows for moving portions of the text horizontally (opening or closing space). This feature permits users to move columns of data relative to each other.

The software is fully supported for all versions of the UCSD Pascal system, and costs \$175.

FOR MORE INFORMATION: VOLITION SYSTEMS, P.O. Box 1236, Del Mar, CA 92014; (714) 457-3865.

SHARE INFORMATION FOR EXECUTIVE PLANNING

TeleVideo's TelePlan, a financial-modeling tool, helps executives, managers and other professionals in resource planning, forecasting and modeling. It also allows users of TeleVideo's configurable multistation computer systems to share the same financial information simultaneously.

Using TelePlan, several people can prepare individually plans or models, then consolidate all of them into a single document or report. The software is customized for the TeleVideo keyboard, with major functions driven by single-key commands. TelePlan financial modeling software runs on TeleVideo TS-806 six-user and TS-816 16-user computer systems.

"TelePlan is designed from a CPA standpoint, specifically for today's demanding business needs," says Chuck Kempton, vice president of marketing and sales for TeleVideo's Computer Systems Division. "Its multiuser capability makes it unique in the personal-computer world."

Available for
IBM PC and Apple III



© Copyright Link Systems 1982

Introducing DataFax...the easy way to tame your Data Monster.

If you deal with information, you're probably dealing with a Data Monster.

He's that mass of notes. Scribbled messages. Phone numbers. And all the thousand-and-one other important pieces of information you have floating around your life.

But with **DataFax** from Link Systems, you can keep your Data Monster under control—plus have a lot more power over your information than you ever thought possible.

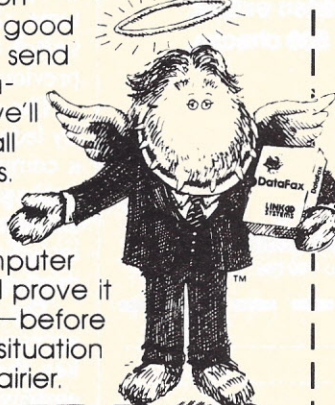
Unlike most "data manager" software programs made for your Apple, DataFax doesn't care what your data looks like. Or how long it is, how many items it has or what you want to do with it.

The power we've programmed into DataFax makes it as simple and natural to use as a pencil and paper. You can fill up a screen with anything you want—even information already stored on disk. Then cross-reference it as many different ways as you'd like—by a date, a species, a customer's name, whatever.

So when you need that information, DataFax will retrieve it in a way that's meaningful to you. The powerful keyword function allows you to get information out as quickly and easily as you entered it. And DataFax is the only software of its kind to let you expand from floppy to hard disks, so it will never be obsolete.

If getting so much power for so little effort seems too good to be true, send us the coupon and we'll send you all the details. Or see your Apple computer dealer and prove it to yourself—before your data situation gets any hairier.

DataFax™
tamed me!



LINK SYSTEMS™

Because whether you've got a monster of a data problem—or just a small one—DataFax can tame it.

I want to tame my Data Monster.™

- ☐ Please rush me more information.
Apple II _____ Apple III _____
☐ Dealer inquiry.
☐ Send me (quantity) _____
DataFax™ for the Apple II at \$199 each. CA residents add 6% tax. Shipping in U.S.A. \$3.00 for first copy, 50¢ each additional copy. Foreign, please add an additional \$10 shipping and handling charge per order.

Payment by
☐ VISA ☐ MasterCard ☐ Check

Credit Card # _____

Expiration date _____

Interbank # (MC only) _____

Signature _____

Name _____

Company _____

Address _____

City _____

State _____ Zip _____

Mail to: Link Systems
1640 19th Street
Santa Monica, CA
90404

PC _____ (213) 453-1851

Apple is a registered trademark of Apple Computer Co., Inc.

Simply powerful software that links it all together™

CIRCLE 136

NEW FREE catalog

Letterheads, Forms and Supplies for Word Processors

Featuring Micro-Perf™ ...
continuous Letterheads with a
clean, trim edge when detached.

Full color catalog also offers checks, statements and invoices designed to work with programs from over 200 software sources. Plus stock tab paper, labels, diskettes, printwheels, work station furniture and accessories.

- Quality products at low prices.
- No "handling charges" or hidden extras.
- Small quantities—as low as 500 checks, statements, invoices.
- Money Back Guarantee.
- One source for your word processing needs.

Fast service ... buy direct by mail or
PHONE TOLL FREE 1 + 800-225-9550

(Mass. residents 1 + 800-922-8560) 8:00 A.M. to 5:00 P.M., ET

NAME _____		
COMPANY _____		
STREET _____		
CITY, STATE and ZIP _____		
To help us send you correct information:		
SOFTWARE BRAND _____	PACKAGE # _____	<input type="checkbox"/> Do own programming
COMPUTER MAKE _____	MODEL _____	<input type="checkbox"/> Not Purchased
LINE OF BUSINESS _____	Number of Employees _____	

Nebs Computer Forms



12 South Street, Townsend, Massachusetts 01469
A division of New England Business Service, Inc.

CIRCLE 172

SOFTWARE OF THE MONTH

For example, one user can call up a forecast that another user is working on, think about it, use it, revise it, and then send it to someone else or back to its originator."

The package offers a range of functions geared to the complete spectrum of TeleVideo business applications, the company says. TelePlan aids managers in modeling tasks such as cash-flow planning, budget preparation, variance reporting, product pricing analysis, manufacturing planning, sales forecasting and capital budgeting. It also offers built-in finance commands, programmability, and sophisticated report generating and formatting capabilities.

"If you've got 10 people working in a marketing department," Kempton says, "and you want to project what will happen if you introduce four new products and sell 'x' of each, one person can assemble a forecast with input and comments from everyone else. TelePlan is ideal for 'group processing.'"

The package costs \$995.

FOR MORE INFORMATION: TELEVIDEO SYSTEMS, INC., 1170 Morse Ave., Sunnyvale, CA 94086; (408) 745-7760.

ENTER ACCOUNTING DATA RAPIDLY AND EFFICIENTLY

Dakin 5's Business Bookkeeping System is a new cash-basis accounting system for small businesses. This set of menu-driven ledgers features more rapid data entry than found in conventional accrual accounting systems, the company says. It is also designed to let users switch to an accrual system at a later date with no loss of previously-entered information.

The accounting system provides three cash basis activity ledgers: customer, vendor and employee. There is also a complete general ledger and a chart of accounts. The package will customize all ledgers to fit users' individual business needs; it will make standard and journal entries including options for adding, changing, removing and printing.

The software includes a security password feature for accessing employee information, as well as a special sort key that enables users to group customers, vendors and employees by categories. It features specialized reporting of financial status, receipts, disbursements and accrued employee salary information, and prints both summarized and detailed reports. Unposted and posted versions of some reports can also be generated. Other reports include: trial balance, income statement, balance sheet, aged receivables, revenue analysis, disbursements, and wage withholding registers.

The Business Bookkeeping System runs on an Apple II, Apple II Plus or Apple III with two disk drives and a printer. It costs \$395.

FOR MORE INFORMATION: DAKIN 5 CORP., P.O. Box 21187, Denver, CO 80221.

Price

That's the only difference between the computers and accessories you can buy from Computer Discount of America, Inc. and the ones you can buy elsewhere.

In fact we will meet or beat any price you can find from an authorized Radio Shack Dealer.

Selection

We have the largest inventory in the Northeast of:

Computers

TRS-80
Atari
Apple
Commodore
Panasonic

Printers

Microline
Epson
C. Itoh

Monitors

Zenith
NEC
Amdek
BMC

Diskettes

Maxell
Wabash
3M

Software

Miropro
Broderbund
Sirius
Visicorp

and the most complete line of accessories, ready to ship.

Service

We ship all orders from stock within 24-48 hours. All items are in factory sealed cartons, and are pure factory built and tested. No untested memory chips from us. And, we will replace any merchandise that arrives initially defective or damaged.

So, if you're looking for the best prices, selection, and service, in the U.S.A., check the others but call Computer Discount of America, Inc.

Send for FREE 40-page catalog including equipment reviews, prices, specs, and illustrations on over 600 computers and accessories.

**Price Is
The Only
Difference!**

TRS-80 Model 16

by Radio Shack

NOW IN STOCK



We will meet or beat any price you can find from an authorized dealer.

Apple II Plus 48K

SPECIAL SALE

**Call For
Prices**



Pure Apple Memory

ATARI 800 Home Computer

16K and 48K RAM

SPECIAL SALE

**Call For
Prices**



We carry all ATARI accessories at low, low prices.

3M Diskettes

Box of 10

744-0 5 1/4" Single Side, Single Density	\$22.45
744D-0 5 1/4" Single Side, Double Density	\$26.45
745-0 5 1/4" Double Side, Double Density	\$32.15
741-0 8" Single Side, Double Density	\$31.95
743-0 8" Double Side, Double Density	\$38.45

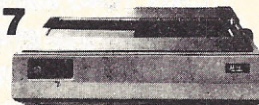
Offer expires 11/30/82

Microline 84 — Parallel

by Okidata

Reg. \$1395

\$977



Call for Special Sale Prices on Microline 80, 82A, and 83. Offer expires 11/30/82.

CALL TOLL FREE: 800-526-5313

Computer Discount of America, Inc.

15 Marshall Hill Road, West Milford Mall

West Milford, New Jersey, 07480-2198

In New Jersey call: 201-728-8080

**Computer
Discount
of America**

TRS-80 and Radio Shack are trademarks of Tandy Co.



FRANCHISE OPPORTUNITY OF THE 80's

SoftwareCenters

Retail SOFTWARE CENTERS
For Business & Personal Computing

Enter the world's fastest growing industry with **Microcon SoftwareCenters** — internationally recognized leader in computer retailing.

Our unique concept offers two distinct programs:

Business SoftwareCenters — specializing in business solutions and a full range of consulting & support services.

Family SoftwareCenters — specializing in entertainment and educational products in the personal computer market.

Franchises available to a limited number of qualified applicants. Total startup investment ranges from \$60,000 to \$150,000 (30% cash required). Call or write:

Franchise Director
Microcon SoftwareCenters, Inc.
25 Elm Street
Watertown, MA 02172
(617) 924-3333

These franchises are offered only through an offering circular where permitted by State law.

CIRCLE 138

SOFTWARE OF THE MONTH

ARRANGE INFORMATION FOR EASY FILE MANAGEMENT

Apple Computer's Quick File III is an easy-to-use filing system for managing small- to medium-size collections of information on the Apple III personal computer. With Quick File III, a doctor, small-business owner, homemaker or scientist can quickly turn receipts, notes, lists and schedules into coherent files and reports.

Quick File III allows for simple arrangement of records in alphabetic, numeric, date or time order, and saves time and effort in producing repetitive reports, calculations, and corrections. Two types of report formats—tables (rows and columns) and labels or index cards—can be created and printed.

The software also allows the user to design forms to meet special needs; allows categories to be added and deleted without retyping previously held information; can selectively search, display, and summarize records; can view many records simultaneously; and can "talk" to Ap-

PLAN 1040

NOW FOR THE FIRST TIME ON MICRO COMPUTERS

PLAN 1040 is a professional TAX PLANNING MODEL. You can plan and analyze **FIVE** alternatives simultaneously and have answers to any "What If" questions instantly. Now you can have the power of spreadsheet programs in the tax planning process. PLAN 1040 will compute all major schedules and will give you the entire tax picture on a one-page Comprehensive Summary. It will also provide you with **six** fully detailed Reports to support the Summary and an audit trail to your assumptions. PLAN 1040 covers:

- Regular Tax
- Inc. Avg. Tax
- Cap. Gains/loss
- Inv. Tax Cr. & Contribution Limits
- Alt. Min. Tax
- Min. Tax (Add-on)
- Lowest Tax

PLAN 1040 runs on CP/M* and TRS-80 Mod II, IBM P.C., APPLE II, NEC P.C. with CP/M.

*CP/M is a trademark of Digital Research

FOR:

- ACCOUNTANTS
- FINANCIAL PLANNERS
- ATTORNEYS
- EXECUTIVES
- BUSINESSMEN

FOR MORE INFO. SEND
YOUR CARD OR NAME TO:

**SUCCESS MANAGEMENT
CONSULTANTS**
318 SURFVIEW DRIVE
PACIFIC PALISADES, CA 90272
(213) 454-8030

DISCOVER TOMORROW'S WAY TO ORGANIZE INFORMATION TODAY...



IFO™ DBMS is a new type of data base manager system for the Apple™ computer.

Unlike any others, **IFO™** employs the use of the **CAPASS™** algorithm and **Soundex** intelligence to phonetically find information that you can't spell or pronounce.

Global edits, calculated fields, screen-building routines, duplicate options, 3 level boolean search capabilities, quick formatted prints and sort files are just a few of the features of the **IFO-Version II** DBMS program.

Flexibility, power and ease of use are standard attributes of the **IFO-Version II**. All this for \$200 (U.S.). But, then again what else can you expect from the company that introduced simplicity to Apple™

ware. By the way, you won't need to know programming or take a course to use our program. Most applications can be done in less than 10 minutes.

If you need more power, we have **IFO-Version III** for the Corvus™. We even have a version for the IBM™ P.C. computer.

For a personal demonstration of **IFO™**, the data base manager of the future, contact your local dealer. If your local dealer does not carry **IFO™**, ask him to give us a call.

Apple is a trademark of Apple Computer Inc.

Corvus is a trademark of CORVUS SYSTEMS Inc.

IBM is a registered trademark of International Business Machines.

Information File Organizer is a trademark of Software Technology for Computers.

CAPASS algorithm is a trademark of Software Technology for Computers.

Software Technology for Computers,

100 Main Street, Watertown, MA 02172.



Software Technology for Computers
P.O. Box 428
Belmont, MA 02178
(617) 923-4334

SOFTWARE OF THE MONTH

ple Writer III and other ASCII character files.

The program provides these additional reporting advantages: It calculates totals and subtotals of numeric information; contains a calculated column (for percentages, the sum of two other columns, etc.); and allows for the choice of which rows and columns are printed.

Quick File III requires an Apple III system with at least 128k of RAM, and has a suggested retail price of \$100.

FOR MORE INFORMATION: APPLE COMPUTER, INC., 20525 Mariani Ave., Cupertino, CA 95014.

WALK THE GARDEN PATH TO BETTER INFORMATION MANAGEMENT

The ROSE Management Information Group is a specially designed data gathering system to help you organize material and use it to become more adept, versatile and creative in business or at home. ROSE tells you exactly how to solve problems, meet goals, open up new horizons, and increase personal productivity, according to

Denver Software, the product manufacturer.

The company says that the real beauty of ROSE is its power and flexibility. This information manager lets you arrange data in formats you design to fit personal needs. Once you've created a format (with spaces for all the information to be entered), just fill in the blanks. You can virtually create a management system for everything in your business or personal life.

A typical use for ROSE would be to create a data base for a customer list. Or, you can use ROSE to generate reminder lists, track and help improve the performance of investments, keep accurate records or maintain a Christmas-card list. You could also use the software to catalog books in your personal or business library, then find what you're looking for by subject, author, title, key word or location.

Each system costs \$349.95 and is designed to operate on an Apple III personal computer.

FOR MORE INFORMATION: THE DENVER SOFTWARE CO., 14100 East Jewell Ave., Suite 15, Aurora, CO 80012; (303) 750-9980.

Experience the Magazines of the Future . . . TODAY



for the Atari 400/800



for the TRS-80
COLOR, Ext. Basic



for the APPLE II+

The Programmer's Institute's magnetic magazines will entertain, educate, and challenge you.

Each issue features ready-to-load programs ranging from games, adventures, home applications and utilities to personal finance, educational, and our unique teaching programs. Our magazines include fully listable programs, a newsletter containing descriptions and instructions for all programs, and notes on programming techniques used.

*"Received my first copy
. . . it's great! Please
rush to me one of each
back issue, so I'll have a
complete set."*

R.G., Chicago, IL

*"Not only are the games
fun and the applications
useful, but the quality of
the programs is excellent."*

S.P., Midwest
Computer Software Sales

COMING SOON: VicVideo for the Vic-20 and PCM magazine for the IBM personal computer.

Plus Educational Software for the Atari 400/800.

ORDERING INFORMATION

Subscriptions*	Cassette	Diskette
Year	\$50.00	\$75.00
½ Year	\$30.00	\$45.00
Trial Issue	\$10.00	\$15.00

* Add \$2.00 postage and handling.

ALL SOFTWARE REQUIRES 16K.

Note: Appletree is available only on diskette.

See your local dealer or order direct: THE PROGRAMMER'S INSTITUTE



a division of FUTUREHOUSE
P.O. BOX 3191, DEPT. 1-D
CHAPEL HILL, NC 27514



1-919-489-2198

10 AM - 9 PM, Mon - Sat

PEACHY GRAPHICS LANGUAGE SYSTEM

PGL, short for Peachtree Graphics Language, is an interactive graphics language newly developed for personal computers. Business Graphics System is the first easy-to-use graphics system built with PGL.

Business Graphics System is a menu-driven graphics application program that runs on CP/M-based personal computers. It can be used to develop presentation graphics such as overhead projection transparencies, slides, business charts and graphs and word charts.

The graphics system, which will soon be available in versions for the IBM Personal Computer and CP/M 86, includes an interface to Peachtree's PeachCalc spreadsheet program and PeachText word processor.

PGL is built around a device-independent graphics programming system. Its English-language commands, the company says, make it possible for inexperienced users to begin writing interactive graphics programs quickly.

Peachtree states further that the output from PGL is comparable with that available from large, expensive sys-

tems. PGL can handle both color and black-and-white graphics.

PGL is device-independent for both input and output, and includes two- and three-dimensional graphics transformations. Supported features include pie and bar charts, multiple exploded pie segments, zooming, panning, strip-chart scrolling, multiple independent graphs, rotation and graphic-arts quality annotation. PGL can be used to display high-precision text in seven different fonts, and it can do polygon filling on both plotters and soft-copy devices.

For input, PGL supports popular digitizers, light pens, cursor keys and joysticks. These can be used to select from menus, define polygons and paint pictures.

Standard device drivers (subprograms that let computers interface with classes of peripherals) included with the program support the Hewlett-Packard HP-GL series plotters, Epson printers (MX-80 and 100), Summagraphics BitPad One digitizers and any PLOT 10 (a graphics language from Tektronix) compatible CRT.

**You've invested a lot of time and money into your computer . . .
It's time that investment paid off!**

THE COLOR ACCOUNTANT

The Programmer's Institute introduces **THE COLOR ACCOUNTANT**, the only complete personal financial package specifically designed for the Atari 400/800 and the TRS-80 COLOR computers. This unique package includes:

- | | | |
|-----------------------------------|-----------------------------------|-------------------------|
| 1. Complete Checkbook Maintenance | 5. Payments/Appointments Calendar | 8. Home Budget Analysis |
| 2. Chart of Accounts Maintenance | 6. Color Graph Design Package | 9. Decision Maker |
| 3. Income/Expense Accounts | (graphs any files) | 10. Mailing List |
| 4. Net Worth Statement | 7. Stock Market Analysis | |

After the initial setup, **THE COLOR ACCOUNTANT** requires less than an hour of data input each month.

The checkbook maintenance program is the key to the entire package. Once your checkbook is balanced, the checkbook summary file will automatically update the home budget analysis, net worth, and income/expense statements. You can then graph any file, record bills and appointments, make decisions, print a mailing list, analyze various accounts or stocks, and even calculate taxes.

All programs are menu-driven and allow add/change/delete. Each file and statement can be listed to screen or printer, and saved to cassette or diskette. **THE COLOR ACCOUNTANT** also comes with 40 pages of documentation that leads you step-by-step through the entire package. The TRS-80 COLOR Ext. Basic requires 16K; the Atari 400/800 requires 24K for cassette and 32K for diskette (\$74.95 cassette, \$79.95 diskette).

THE TAX HANDLER

The perfect supplement to **THE COLOR ACCOUNTANT**, *The Tax Handler* includes:

1. Complete Form 1040
2. Schedule A (Itemized Deductions)
3. Schedule G (Income Averaging)

This year let *The Tax Handler* prepare your taxes (\$24.95 cassette, \$29.95 diskette).

See your local dealer or order direct:

THE PROGRAMMER'S INSTITUTE

a division of FUTUREHOUSE
P.O. BOX 3191, DEPT. 1-D
CHAPEL HILL, NC 27514



1-919-489-2198

10 AM - 9 PM, Mon - Sat

SOFTWARE OF THE MONTH

FOR MORE INFORMATION: PEACHTREE SOFTWARE, 3445 Peachtree Rd. N.E., Atlanta, GA 30326; (404) 239-3000.

WHEN SPELLING COUNTS

The Sensible Speller, a spelling verification program for the Apple II personal computer, features the complete Concise Edition of the Random House Dictionary.

Five versions of the Sensible Speller are available. There is no need to muffle or transfer your files from one operating system to another. The DOS 3.3 version works with Apple Writer I or II, Apple Pie, The Correspondent, Executive Secretary, Letter Perfect, Magic Window, Screenwriter II, Text Editor, TXT/ED, Write-On, Word Power, Pie Writer and other word processors that generate standard DOS 3.3 text or binary files. There are also versions for Super Text, Super Text II, Super Text 40/80, Word Handler II, CP/M-based systems and Pascal.

The Sensible Speller requires an Apple II or Apple II Plus equipped with 48k, DOS 3.3 and one or two disk drives. Two disk drives are needed to delete from or add words to the dictionary. The price is \$125.

FOR MORE INFORMATION: SENSIBLE SOFTWARE, 6619 Perham Dr. West Bloomfield, MI 48033; (313) 399-8877.

EASY WORD PROCESSING FOR HARRIED PROFESSIONALS

Kensington Microware Ltd.'s Format-II is a word processor designed for use in professional office environments. The product offers significant advantages over previous word processing offerings for the Apple II, the company says.

Format-II is a machine code, core-resident program. Once booted there is no further need to access the program disk, and both disk drives become available for text. It also does away with confusing CTRL functions. All editing and formatting commands are accessed with single key strokes. To center a block of text, touch "C"; to delete, touch "D"; justify, touch "J", and so on.

The program comes with a built-in mailing list. Users are provided with records up to 16 fields (lines) long and 450 records fit on each mailing list disk. Users can perform alphanumeric sorts and string eight of 16 fields within complicated logic.

Format-II supports all Apple II compatible printers. It requires an Apple II Plus with an 80-column card and 48k or 64k of RAM. Suggested retail price is \$375.

FOR MORE INFORMATION: KENSINGTON MICROWARE LTD., 300 East 54 St., New York, NY 10022; (212) 490-7691.

A NEAT LITTLE PACKAGE DELIVERS MAIL

The Mail Monitor, an electronic-mail software package, allows local area network users to send letters or data to each other on the Apple II and Corvus Concept computers. An optional version that supports a modem

allows information to be transmitted over telephone lines to distant networks.

The Mail Monitor contains two programs: the central control Post Office program, which runs on a dedicated Apple II computer; and the Mail Box program, which runs on each user's computer on the network. The Post Office program acts as the main distribution center for all mail. The local Mail Box program is run by the user to create and send letters to the post office for distribution to other user locations and to access mail deposited at the post office.

One letter can be addressed to specific locations or to a general distribution list. Senders are notified when any letter has been received by everyone on the address list. Data or text files can be sent along with a letter.

Two versions of the Mail Monitor are available. One for local networks only and one with software support for a modem for communication with distant networks. Either version allows attachment of up to 64 Apple II workstations on a local network. Suggested retail price of the local area network Mail Monitor, including Apple II Post Office and Apple II Mail Box, is \$495. The Mail Monitor with modem support is priced at \$750.

Although the central post office must be an Apple II, an optional diskette priced at \$200 allows Corvus Concept workstations to be attached to the local area network as any of the 64 workstations.

FOR MORE INFORMATION: SOFTWARE CONNECTIONS, 1800 Wyatt Dr., Suite 17, Santa Clara, CA 95054; (408) 988-3704.

SOFTWARE FOR WORLD VIDEOTEX SERVICE

Logica's new Appletel Disk allows Apple computer users to plug into the Prestel World Videotex Service. The software turns the personal computer into a terminal to retrieve a wide range of international data.

The user can access regularly updated prices of 63 commodities from exchanges in the U.S., Europe and the Far East; 64 currency exchange and IMM rates; and 713 U.K. and other stocks. Many other data bases are also available including: financial management information on worldwide corporate sectors; economic indicators and statistics on most industrialized countries; locations of 22,000 deep-sea ships "bound for" or "in port"; bookings at over 400 hotels in the U.K. and elsewhere; airline schedules of over 50 carriers with reservation facilities on major airlines; electronic messaging to other Prestel users; and international news, sports and weather.

With the Appletel Disk, an Apple Computer and a Hayes Micromodem, the user simply accesses a local telephone number, enters a password, and retrieves any of the more than 220,000 pages in the Prestel data base.

The price is \$85.

FOR MORE INFORMATION: LOGICA/BVT, 666 Third Ave., New York, NY 10017; (212) 599-0828.

COMPUTER



SPECIALTIES

**APPLE LOADER for
COMMODORE 64
ORDER NOW - \$79**
Atari & TRS 80 Avail.

COMMODORE VIC-20

HARDWARE

Datasec	64	Super Expander	49
Disk Drive	469	Programmers Aid Card	44
Graphic Printer	328	VicMon	43
1K Mem. Expander	39	Pro. Ref. Guide	14
6K Mem. Expander	75	Joystick	8
14K Mem. Expander	139	Paddles	15
RS232 Card	39	Modem	95
EEE-488 Card	69		

NEW

Slot Expander	118
Atari Cartridge Adapter	CALL
0 Col. 8K Board	109
IIC 8K	199
from Expan. Chassis	198
Ideo Pak (40/80 col. 16K)	229
Ideo Pak (40/80 col. 64K)	319

NEW FROM C.S.

ic Education Pak	469
ic Small Business Pak	479
ic Home Computer Pak	459
ic Communications Pak	489

SOFTWARE ON CARTRIDGE

Spiders of Mars	36	Outworld	29
Robot Blasters	30	Adventure Land	29
Meteor Run	36	Pirate Cove	29
Satellites & Meteors	36	Mission Impossible	29
Amok	29	The Count	29
Alien Blitz	29	Voodoo Castle	29
Radar Rat Race	23	Astro Blitz	38
Sargon II	33	Wizard of Wor	27
Trashman	35	Dogpatch	27
Blackhole	35	Pinball Spectacular	27
Sorf	23	Super Alien	22

ON TAPE

icalc	11	Hsehold Fin. Pack	27
Bill Payer	14	Vic Journal	29
Vic 6 Paks	44	Rec/Ed Pack I or II	12

Call For Free Catalog!

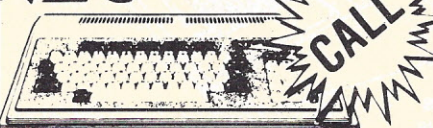
ATARI 400 16K 264
800 16K 664

110 Recorder	77	The Bookkeeper	194
110 Disk Drive	439	The Entertainer	69
125 Printer	639	The Educator	124
130 Modem	159	The Programmer	56
150 Interface	159	The Communicator	334
Full-View 80	279	PacMan*	33
Joystick (Pair)	18	Mouskattack	26
18K by Intek	189	Choplifter	27
32K by Microtek	99	Frogger	27
16K by Microtek	69	Gorf	33
Epson Cable	34	Microsoft Basic	69
Ram Cram	109	Word Processor	109
Ram Disk	429	Visicalc	189

Call For Free Catalog

*\$25.00 if Purchased with 400 or 800

NEC PC-6000



Features: Color • Sound • 71 Key Keyboard
• 10 Function Keys

"The Computer you've been waiting for Home, Education, Business and Fun."

ACCESSORIES Avail. include:

- Expansion Unit
- Printer
- Touch Panel

SOFTWARE • Music Editor
• Othello
• Graph Generator

And More!

PC-8000

- NEC PRINTER
- NEC add on Dual Drive
- PC-8001 A
- NEC Green Screen
- NEC I/O Unit

Call For
Total System
Price and...
SAVE!!!

**ORDER
TOLL-FREE!! 1-800-854-2833**



*APPLE IS A REGISTERED TRADEMARK

ACCESSORIES

Fourth Drive	299	Sooper Spooler (16K)	299
Fourth Controller	89	Z-80 by Microsoft	248
Rana Elite One	389	Videoterm (80 col.)	258
Rana Controller	99	Signalman Modem	89
Micro Sci A-2	389	Synergy Card by Spies	169
Micro Sci A-40	384	RGB by Electrohome	159
Micro Sci A-70	489	Parallel Card (6' cable)	69
3" Drives by Amdek	749	Z-Card by ALS	189
Vista Slim Line 8"	CALL	Versa Card	169
8" CNTRL by Vista	CALL	The Grappler Plus	119
16K Ram (2yr WNTY)	59	Joystick by TG	46
32K by Saturn	199	In Fone	CALL
AIO II	189	The Mill	319
CCS 7710A	129	Lower Case	29
CPS Multi-Func by Mtn	185	Expan Chassis by Mtn	559
Micro Modem II*	278	Winchester Hard Disk	CALL
Smart Modem	229	Appli-Card	339
Hayes 1200 Baud	CALL	Strobe Plotter	659
Enhancer II	124	Soft Term	109
Microbuffer II (16K)	209	System Saver	69
Microbuffer II (32K)	229	Amber Monitor by USI	179
Num. Keypad (23 Key)	115	Function Strip by Videx	59
Disk Emulator (294K)	799	Bubble Mem by MPC	CALL
Sup R Mod	33	App-L-Cache 256K	989

**"NEW" ACE 1000
WITH COLOR**

BASIS 108
Now Shipping — CALL

Both of these new systems are
100% compatible with the Apple Accessories
and Software listed above

**FREE CATALOG !!
1-800-854-2833**



Z-89-81	• 48K Ram	• 1S 100K Drive	\$2195
Z-90-82	• 64K Ram	• 1D 160K Drive	\$2369
Z-100			CALL
13" Color RGB			599

PRINTERS, MONITORS, TERMINALS

PRINTERS

C-itoh ProWriter (Para)	459
Smith-Corona TP-1	659
Okidata 82 A	479
Okidata 83 A	695
Nec 8023	469
IDS Prism 80	789
Complete Line	CALL

TERMINALS

Televideo 910 Plus	596
Televideo 920C	789
Televideo 950	989
Adds View Point A-1	576
Adds View Point 3A+	589
Zenith Z-19-CN	769
Zenith ZT-1	CALL

MONITORS

Amber Monitor by USI	176
Nec Green	167
Amdek Color II	679
Call For Complete List	

Vista Vision 80	269
ALF 9 Voice	149
Plakso by IS	CALL
Premium Pak by M. S.	528
AD+DABY Mtn (nocable)	269
Apple Cat II	339
Wizard - BPO	149
Wizard - SOB	219
Thunder Card/Cal	119
Smarterm 80 Col.	288
16 Voice by Mtn. Hard	297
8088 Card by ALF	295
Synergizer Pack by ALS	579
212 Apple-Cat II	CALL
The Clock by Mtn Hard	219
Voice Box (w/firmware)	149
The Dumping-GX	129

SOFTWARE

Screen Writer II	103
Magic Window	89
SuperText II by Muse	118
AppleSpeller/Sensible	56
Exec Secretary by S.S.	189
Pro. Easy Writer by IUS	129
LetterPRF w/mailmerge	109
Word Handler	147
General Manager	109
Visicalc by Visicorp	183
PFS by Soft Pub. Corp	69
Visifile by Visicorp	184
Visitr/Visitp by Visicorp	196
PFS: Report	69
DB Master	164
PFS: Graph	184
Desktop Plan	184
Wall Street by M.L.	219
Graph Magic by ISM	62
Target Planner Calc.	36
Math Magic by ISM	63
Home Acct. by Cont.	56
UCSD P-System	468

CP/M SOFTWARE

Basic Interpreter	CALL
Basic Compiler by MS	289
Cobol-80 by Microsoft	539
Fortran-80 by Microsoft	146
Word Star	196
Mail Merge	69
Spell Star	109
Data Star	109
Calc Star	109
Supercalc	212
d Base by Ashton-tate	494
B/L by Peachtree	CALL
A/R by Peachtree	CALL
Peackcalc	239
Quickcode	239
Tax Preparer '82	119
Real Estate Analyzer	139
Bag of Tricks	29
Zoom Graphics	27
Special Effects	27

ENTERTAINMENT

Cashe Wolfenstein	19
Flight Simulator	26
Sargon II	25
Southern Command	43
Deadline	34
Time Zone	79
Kabul Spy	26
Zork II	26
Knight of Diamonds	25
Wizardry	37
Atlantis	29
Crush Crumble Chomp	23
Snack Attack	22
Pinball: Nite Mission	25
Frogger	24
Dauids Midnight Magic	26
Apple Panic	21
Mouskattack	24
Choplifter	24
Crossfire	21

IBM • IBM • IBM

ACCESSORIES

BIG BLUE	499
Combo Card by Apparat	239
Clock/Cal by Apparat	109

64K w/Parity	249
128K w/Parity	359
192K w/Parity	539
256K w/Parity	679
Quadboard 64K	419
Quadboard 256K	679
64K Ram + by Seattle	389
256K Ram + by Seattle	799
RGB Monitor	CALL
AST Combo Plus 64K	469
AST Combo Plus 128K	639
Hard Disk	CALL
Joystick	47
Expansion by Tecmar	739

SOFTWARE

Word Star	279
Mail Merge	88
Peachtree Pkgs	CALL
Home Acct. Plus by Cont	109
Volks Writer	149
Visicalc (256K)	194
Visicalc (std)	157
Vedit by Compuvue	123
Supercalc by Sorcim	217
Easy Writer II by IUS	258
Easy Speller by IUS	128
Fast Screen by CU	73
Everest Explorer	17
Deadline	39

COLUMBIA

DATA PRODUCTS, INC.

**MULTI-PERSONAL COMPUTER
100% IBM P/C COMPATIBLE - CALL**

TO ORDER: Phone orders invited using Visa, Mastercard or bank wire transfers. Visa and MC service charge of 2%. Mail orders may send charge card number (include expiration date), cashiers check, money order, or personal check (allow 10 business days for personal or company checks to clear). Please add 3% (\$5.00 minimum) for UPS shipping, handling, and insurance. APO and FPO include 5% (\$7.00 minimum) for postage. Calif. residents add 6% sales tax. Please include phone number on all orders. FOREIGN ORDERS include 1% handling — shipped air FREIGHT COLLECT only. Credit cards not accepted on foreign orders. All equipment is in factory cartons with manufacturer warranty. Opened products not returnable. Restocking fee for returned merchandise. Equipment subject to price change and availability. Retail prices differ from mail order prices. WE SHIP THE SAME DAY ON MOST ORDERS! \$25 min. purchase.
*Exclude certain printers & monitors & foreign orders.



(714) 579-0330 CIRCLE 144

**MAIL TO: 1251 BROADWAY
EL CAJON, CA. 92021**

TELEPHONE VOICE RESPONSE

The V100 interactive voice synthesizer with telephone interface is an Apple II® or IBM Personal Computer® compatible, low-cost, solution to remote data base access arrangements.

\$395⁰⁰

V100-A

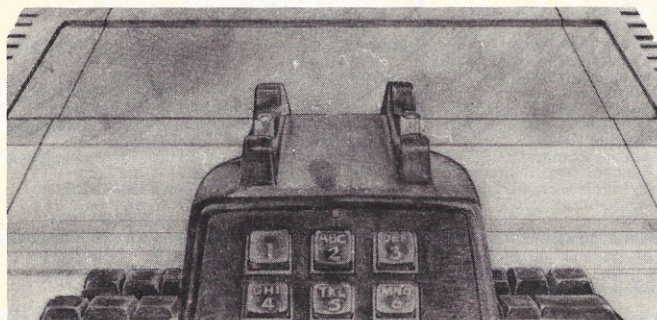
- Direct telephone connection, auto-dial/answer
- Touch-tone® generation and detection
- Includes 300 word, LPC vocabulary
- Software for sentence/library construction
- Expandable with 1300 (\$495) high quality LPC words

For a demonstration call toll free (800) 538-7002
In California call (408) 942-1595

VYNET CORPORATION

CIRCLE 91

2405 Qume Dr., San Jose, CA 95131 (408) 942-1037



SOFTWARE INDEX

SOFTWARE INDEX A COMPREHENSIVE LISTING OF NEW PRODUCTS

BUSINESS

PRODUCTS/FEATURES/PRICE

COMPANY/AVAILABILITY

EXECUTIVE/PROFESSIONAL

Altos Accountant provides inventory, job costing, accounts receivable, accounts payable, general ledger, sales order processing and payroll for CP/M and MP/M-based systems
\$2495 (includes hardware)

Altos Computer Systems
San Jose, CA 95131
retail
CIRCLE 300

Altos Executive Word Processor combines text editing, spelling checking and a merge program for mailing list management for CP/M and MP/M-based systems
\$295

Altos Computer Systems
San Jose, CA 95131
retail
CIRCLE 301

Make your Apple II[®] shine with all new SYSTEM SAVER[™]



LINE SURGE SUPPRESSION



QUIET COOLING FAN

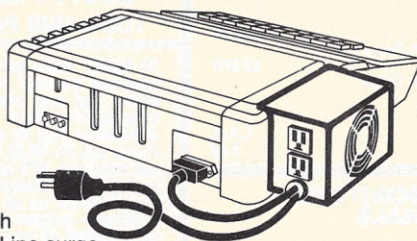


DUAL AUXILIARY OUTLETS



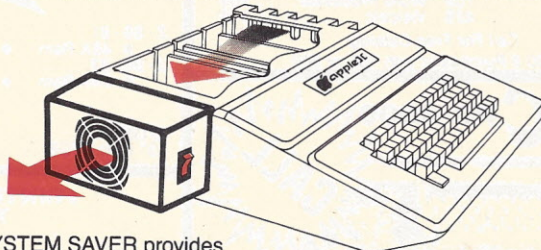
FRONT POWER SWITCH

COLOR MATCHED SIMPLY HANGS ON APPLE.



Power input through SYSTEM SAVER. Line surge suppression protects programs and data by smoothing out dangerous power surges and spikes.

SYSTEM SAVER contains two switched power outlets. You can control your printer and monitor from the front mounted switch.



SYSTEM SAVER provides correct cooling. Fresh air is drawn across the mother board, over the power supply and out the ventilation slots.

Convenient front mounted heavy-duty power switch with pilot light. Switch controls SYSTEM SAVER, Apple II, and both rear outlets.

\$89⁹⁵ at your local dealer
or order direct by
phone or mail from:

Kensington Microware Ltd.
300 East 54 Street
Suite 3L
New York, NY 10022
(212) 486-2802

Dealer inquiries invited.

When ordering by mail include payment of \$89.95 plus \$2.50 for handling. New York State residents add 5¼% sales tax. By phone payment can be charged to VISA or MASTERCARD.



INFOWORLD RAVES ABOUT PERFECT WRITER!™

**Read for yourself
what InfoWorld
said about this
incredible word
processor!**

“Perfect Writer would be my choice for a word processor in my home.”

“Perfect Writer lives up to its name. This product appears to be a very solid piece of software. Text handling is convenient and versatile and you are given an unusually complete set of commands.”



All quotes are from InfoWorld's Perfect Writer software review, by John Ford, June 14, 1982.

Copyright 1982 by Popular Computing/Inc., subsidiary of CW Communications/Inc. Reprinted from InfoWorld.

“‘User friendly’ is a trite, but true description of Perfect Writer.”

“Personally, I found the full-screen text to be comfortable and in most respects superior.”

“The documentation is superb...”

“I believe Perfect Writer will serve individual writers very well indeed.”

“I can recommend the program as a model of clarity.”

AND WE'VE GOT IT FOR JUST \$249.

Perfect Writer is perfect for most CP/M® computers including Apple II and III, with CP/M®, and the new IBM DOS.

No wonder our phones are ringing off the hook! After InfoWorld went wild about Perfect Writer, it's become the hottest piece of software we handle.

Why? Because Perfect Writer is simply the best word processor you can buy at any price and 800-SOFTWARE is selling it for just \$249. That's \$140

off the manufacturer's suggested retail price of \$389!

What's more, we are *the* Perfect Writer experts—the first dealer to stock Perfect Writer in the entire United States!

What does this mean to you? Product knowledge and support exper-

tise you simply won't find any place else. Plus the giant inventory, fast delivery and commitment to first class service you've come to expect from 800-SOFTWARE.

But let us prove how good we are. Just pick up the phone and call us toll-free. We're waiting for your call.

TO ORDER CALL TOLL-FREE:

800-227-4587

In California, call: 800-622-0678
CA residents add sales tax.

Or write:

800-SOFTWARE, INC.
185 Berry Street, Suite 6820
San Francisco, CA 94107

☐ Purchase orders accepted.
☐ Prompt UPS 3 day Blue Label service.
☐ Call for shipping charges.

800-SOFTWARE



CIRCLE 145

CHECK THESE OTHER
GREAT PRICES:

Wordstar™ \$249

dBase II™ \$495

SuperCalc™ \$199

PW10



NEW!! The Apple users group software library bonanza at truly affordable prices. For the first time enjoy your Apple to its fullest capacity using specially packed disks with over **60 outstanding programs each**. Not available from any other source!

• Applesoft • 3.3 DOS

APPLEWARE INC. offers

An extensive variety of interesting, useful and entertaining programs indispensable to the serious computerist including:

Business •	Educational •	Graphics •
Games •	Music •	Science •
Utilities •	Data Base •	Finance ...

Library disks 1, 2 & 3 are mixed categories and new disks 4 (Games), 5 (Utilities), 6 (Graphics) & 7 (Integer) at \$59.95 each. Why pay more?

Order direct from this ad and **Save up to \$136**. Buy disk library package 1, 2 & 3 and get a special bonus disk **FREE** — over **260** programs for \$179.95 + shipping. For best value, get all 8 disks for \$349, postage prepaid, for over **530** of our best programs at 65¢ each! Call now toll free: 1-800-327-8664

Florida: 1-305-987-8665

6400 Hayes St.

Hollywood, FL 33024

CIRCLE 146



Kill Surges Like Lightning!



Surge/Dropout and U.S. Standard models.

Now, with Surge Sentry™, you can protect your personal computer, or entire home computer/entertainment center from destructive power surges, drops, and electrical noise ... starting at less than \$90!

Simply plug Surge Sentry in for fast, *permanent* protection. Surge Sentry will not degrade ... no matter how many surges it kills. The indicator light tells you it's working perfectly, and we back every unit with a one year "no questions asked" warranty.

To learn more about surges and the entire Surge Sentry line, call or write:

RKS INDUSTRIES

Toll-free (800) 892-1342, from California (408) 438-5760
4865 Scotts Valley Drive, Scotts Valley, CA 95066

CIRCLE 147

SOFTWARE INDEX

Business Bookkeeping System
cash basis accounting system
for small business
for Apple II, Apple II Plus and
Apple III
\$395

DAKIN 5 Corporation
Denver, CO 80221
see story on page 224
retail
CIRCLE 302

Business Graphics System
develops presentation graphics
such as overhead
projection transparencies,
slides, business charts and
graphs, and word charts
for CP/M-based systems
\$400

Peachtree Software
Atlanta, GA 30326
see story on page 229
retail
CIRCLE 306

Business Software Series
includes inventory control
for manufacturers, job cost
control, general ledger, accounts
receivable, accounts payable
and retail/wholesale inventory
for MP/M-I or MP/M-II-based
systems
from \$600

Microcomputer Consultants
Davis, CA 95616
retail
CIRCLE 303

C*D*CALC
calculates the monthly interest
costs of certificates of deposit
for banks and savings and loans
institutions
for TRS-80 Model III
\$485

Computer Software Services
Oak Ridge, NJ 07438
retail and mail order
CIRCLE 304

Copyart II
offers graphics, advanced math,
sorting and a mail merge utility
for TRS-80 Models I and III
\$149.95

Simutek Computer Products
Tucson, AZ 85712
mail order
CIRCLE 305

CYLAW
consists of four major modules:
time and disbursement
accounting and client billing
(including narrative billing);
management reports; calendars;
and docket control
for IBM Personal Computer
\$5000

Cybernetics Resource Corp.
Port Washington, NY 11050
retail
CIRCLE 307

Data Design
data-base manager which is
entirely menu-driven and includes
interactive help screens built into
the software for overview and
quick reference
for IBM Personal Computer
\$225

Insoft
Portland, OR 97219
mail order
CIRCLE 308

DMS Data Management System
designed to allow a user to
create data entry forms directly
on the CRT screen and then
use these forms for data entry,
retrieval, modification, correction,
deletion, and report printing
for IBM Personal Computer
\$150

Intellect Associates Inc.
Holbrook, NY 11741
retail
CIRCLE 309

TIM[®] III

The Non-Programming Approach to Data Base Management

Data Base Management

Data management packages were created to save time and money in the development of software solutions to information problems. Many have been designed to accomplish just that, although most have only the programmer in mind. Sure they would save time in the long run, but what of the initial investment in time and effort required to learn the new language? What about the non-programmers in the world who would like an easy yet powerful applications generator? The solution is one of the most highly acclaimed software packages of our time, T.I.M. III.

What is T.I.M.?

T.I.M. is **Total Information Management**. Programmers love it due to its original solutions to classic data management problems. Non-programmers adore it since they can use it to achieve the same results as with other more complicated programming-like packages.

What Makes T.I.M. So Simple to Use?

We at Innovative Software, Inc. designed T.I.M. from day one with the end user in mind. Maybe he is a programmer who doesn't have time to learn a new language. Or perhaps a neophyte who fears coding pads and lines numbered by tens. We felt that a data

management package should be able to be used by anyone from a systems analyst to a secretary. That's why T.I.M. takes a full *menu-driven* approach, uses multiple *HELP* screens, and has a manual that sets a new standard in documentation.

Features of T.I.M.

T.I.M. has all of the features one has come to expect from a data management package, as well as many new ones. For example, a *word processing* interface that allows you to merge information from a T.I.M. file with letters or other documents created by a word processor. Now you can automatically send personalized letters to hundreds or thousands—quickly and easily. T.I.M.'s *Select* command enables you to pull specific information from a file. For example, "All customers who live in a certain ZIP code, whose last name begins with the letter A to L, whose balance due is less than \$50.00." A sophisticated *report generator* and even a *list generator* are also included.

How powerful is T.I.M.? With a maximum record size of 2400 characters and the ability to keep up to forty fields sorted properly at all times, T.I.M. is powerful enough to handle just about any application. T.I.M. can handle over 32,000 records per file, and two files can be linked together for reports if your application requires a many-to-one relationship. T.I.M. also includes all of the same editing commands as your word processor, thus making data entry and

editing a snap. You can also pull selected records from one file to place them into another. Files may be restructured to add or subtract fields and/or change field lengths or types. T.I.M. even has its own utility for backing up hard disks onto floppies.

The Manual

Many people believe that the manual is just as important as the software itself, a view that we at Innovative Software, Inc. tend to share. The manual for T.I.M. is divided into two sections, the Reference section and the Primer. The Reference section describes all of T.I.M.'s commands and subcommands. This is done in English, not in technical terms or in our own language. Even if you have never seen a computer before in your life, you'll be able to read and understand our manual immediately. The second section is a primer which goes through several examples for you, again in plain English. These true-to-life examples take the beginner by the hand, and instruct him what to do and when. You will be able to see for yourself that T.I.M.'s only limitation is the imagination of the user.

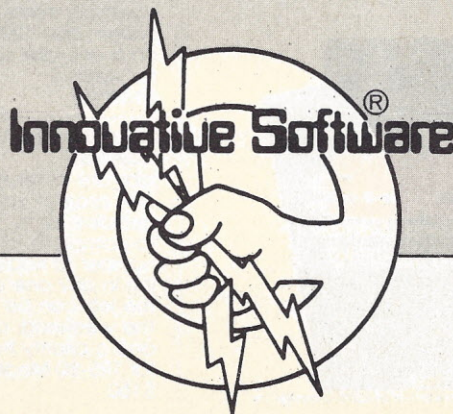
Where to Find T.I.M.

T.I.M. is available from many fine computer dealers across the country. Or you may purchase from us direct by calling 913/383-1089. Either way you will have the finest data management program available.

Available for CP/M,* and
IBM PC DOS.**

CP/M version—\$695. IBM PC version—\$495.

TIM is a Registered Trademark of Innovative Software, Inc.
*CP/M and MP/M are Trademarks of Digital Research
**Trademarks of IBM



Innovative Software, Inc.
9300 W. 110th Street, Suite 380
Overland Park, Kansas 66210 USA
913/383-1089

ANNOUNCING AN INNOVATION IN TYPING INSTRUCTION.

FUN.

Improve your keyboard skills with MasterType.

A typing program for the Apple II that dares to be fun. But it's not just child's play. No matter who you are, your computer will become a more efficient tool, as you become a more proficient typist. And MasterType can help. Dramatically.

But don't just take our word for it.

Infoworld magazine had this to say about Lightning Software's Hi-Res MasterType: "MasterType is an excellent instructional typing game. We had fun reviewing it, and we highly recommend it to those who want to learn typing in an unconventional but motivating way."

Infoworld also went on to rate MasterType as Excellent in all categories.

Good news for Atari owners!

MasterType will introduce an Atari version on July 1st. Watch for it!

Attention all Dealers.

Don't miss out on one of the hottest selling software products on the market. Call today for a free demo disk.

Lightning Software ©
P.O. Box 11725, Palo Alto, CA 94306
(415) 327-3280



Atari is a registered trademark of Atari, Inc., Apple II is a registered trademark of Apple Computer, Inc.

CIRCLE 116

SOFTWARE INDEX

EasySpeller
a spelling assistance software package designed to check the spelling of documents created by EasyWriter for IBM Personal Computer \$175

Proximity Devices Corp.
Fort Lauderdale, FL 33308
retail
CIRCLE 310

The Encryptor
economical encryption/decryption package featuring programmed input/output for Oasis systems, IBM Personal Computer and Apple II \$395, \$295, and \$245, respectively

Jones Futurex Inc.
Fair Oaks, CA 95628
retail
CIRCLE 311

Five Star Software
designed to completely handle a small business' general record-keeping needs for Z80-based systems \$595

Pericomp Corp.
Natick, MA 01760
mail order
CIRCLE 312

Format II
all editing and formatting commands are accessed with single key strokes for Apple II Plus \$375

Kensington Microware Ltd.
New York, NY 10022
retail
CIRCLE 313

I-PLOT
plotting program that will accept data for plotting from either the keyboard or a data file that has been created by another program for IBM Personal Computer \$250

Management Solutions
Chagrin Falls, OH 44022
retail
CIRCLE 314

Integrated Business Information System (IBIS)
a comprehensive set of accounting packages designed to meet the needs of professional accounting firms, bookkeeping agencies, and small businesses for DEC Rainbow, DECmate II and Professional Series \$695

PDS Microsystems
Carson, CA 90749
retail
CIRCLE 315

Inventory Manager
can deal with 2700 different inventory items on a two-disk system and 1200 inventory items on a one-disk system for Apple II \$149.95

Synergistic Software
Renton, WA 98055
mail order
CIRCLE 316

Job Scheduler-Deadline Calendar
jobs are entered in any order with project name, job name, deadline date, number of hours to complete job, minimum number of hours to work on the job in any one day, whether the job can be scheduled for the weekend, a dollar amount, and a priority from 1-9 for TRS-80 Models I and III \$160

Lefkoff Innovation Corp.
Washington, DC 20005
mail order
CIRCLE 317

Announcing the best Error Free Personal Computer Diskette Money can Buy. For Less.



- Error Free
- 1 year warranty
- Hub ring installed
- Write/Protect notch
- Next day delivery

\$19.90/box of 10

- No minimum order quantity
- 8" or 5 $\frac{1}{4}$ "
- Plus 2 Free BONUS DISKS/Box*

*5 $\frac{1}{4}$ " SPECIAL ONLY

if you are a member of a user group or a school district please call for special terms on future offers. **TSS** is the largest specialty supplier of magnetic media in the Midwest. We have the products that you want when you need them. Please take advantage of this introductory offer and call us **now**.



Transaction
Storage Systems, Inc.
MAGNETIC MEDIA SPECIALISTS

ALL TOLL FREE

300-521-5700

300-482-4770 (Michigan)

3-557-3036 (Detroit)

2-922-0076 (Chicago)

4-221-1788 (Columbus)

3-621-1518 (Cincinnati)

telex 810-224-4646

EXPECT A MIRACLE

YES, **TSS** is the magnetic media supplier that I have always wanted.

Please send me _____, 8" ☐ 5 $\frac{1}{4}$ " ☐, @ _____ ea.
Box Quantity Price

I am interested. Please send me more information
or call me at () _____

For faster order entry call any of our toll-free or local numbers

Company _____

Name _____ Title _____

Address _____

City _____ State _____ Zip _____

Amex/Master Card/Visa orders are accepted Expiration Date

_____ month _____ year _____

SERIOUS STATISTICS FOR YOUR MICRO: STATMANAGER

Hayden's STATMANAGER is a sophisticated yet easy-to-use statistical package for researchers who don't have time or money to waste. STATMANAGER is designed for the researcher who wants to develop his own file structures, who needs a broad array of statistical computations, who wants to present data graphically and who doesn't want the hassle or expense of mainframe timesharing.

STATMANAGER is designed for personal microcomputers and runs under the CPM operating system. Menu driven with simple commands and clear user prompts, STATMANAGER is both easy to use and very powerful. And it was built to serve the researcher, not the computer buff.

With STATMANAGER, you can:

- Create and organize data files.
- Add, modify or delete data.
- Sort alphabetically or numerically.
- Run descriptive statistics, including mean, variance and standard deviation.
- Do T-Test and paired T-Test comparisons, linear or transformed correlations.
- Do X-Y plotting, regression line plotting, and combined regression line and data plotting.

Choose how you want to see it: display selected data and graphic displays on the terminal screen or print them out as hard copy.

STATMANAGER from Hayden Software. Serious statistical management capabilities on your own microcomputer.

Available from your local dealer, or call:

1-800-343-1218

(in MA call 617-937-0200)

HAYDEN SOFTWARE

SOFTWARE INDEX

Jobtrax
a project management package for planning and monitoring typical engineering, architectural and construction projects for IBM Personal Computer
\$250

Omicron Software
Atlanta, GA 30329
mail order
CIRCLE 318

Ledgermaster
features include: up to 90,000 accounts per company; automatic project/job cost accounting and monthly budget or historical comparisons for CP/M- and MP/M-based systems
\$950

Executive Data Systems Inc.
Atlanta, GA 30339
retail
CIRCLE 319

Municipal Billing Systems (MBS)
generates a full range of reports that a municipality needs to maintain and control their utility billings for TRS-80 Model II from \$2000

Foy Inc.
Farmersville, TX 75031
retail
CIRCLE 320

Micro-Foresight
a multifunctional financial analysis and modeling package for Vector Graphic and IBM Systems
\$2500

United Information Services Inc.
San Diego, CA 92111
mail order
CIRCLE 322

Micromap II
a tool for any researcher who requires statistical representation of spatial data for Apple II
\$650

Morgan-Fairfield Graphics
Seattle, WA 98105
mail order
CIRCLE 323

Monroe SuperWord
offers improved office productivity and substantial time savings by eliminating repetitive typing chores for Monroe OC 8820
\$525

Monroe Systems For Business
Morris Plains, NJ 07950
mail order
CIRCLE 324

PLAN 1040
runs five simultaneous alternatives to evaluate the federal tax impact of contemplated transactions for IBM Personal Computer, TRS-80 Model II, NEC PC-8000 and Apple II
\$295

Success Management Consultants
Pacific Palisades, CA 90272
retail
CIRCLE 325

Plotstar
prepares graphs for use in business and scientific presentations for CP/M-based systems and IBM Personal Computer
\$975

Covington Computer Sales Ltd.
Ottawa, ONT K1H 5M7
retail
CIRCLE 326

PocketCalc I
a library of spreadsheet programs

PocketInfo Corp.
Beaverton, OR 97007
mail order

for Sharp PC 1211, Radio Shack PC-1 and CASIO FX-702P
\$30

CIRCLE 327

PR-1
calculates payroll for every type employee while maintaining monthly, quarterly and yearly totals for reporting purposes in multiple states for IBM Personal Computer
\$248

Micro Architect Inc.
Arlington, MA 02174
mail order
CIRCLE 328

Quick File III
turns receipts, notes, lists and schedules into coherent files and reports, and allows for simple arrangement of records in alphabetic, numeric, date and time order. for Apple III
\$100

Apple Computer Inc.
Cupertino, CA 95014
see story on page 226
retail
CIRCLE 329

ROSE Management Information Group
an information gathering system that arranges data in formats designed to fit special needs for Apple III
\$349.95

Denver Software Co.
Aurora, CO 80012
see story on page 228
retail
CIRCLE 330

SCREDIT
handles multi-keyed 65,000-record ISAM files, full-text and selected-text search options, powerful report-writing and label-printing capabilities for OASIS operating system
\$299

Integron Systems
New York, NY 10025
mail order
CIRCLE 331

Sensible Speller
a spelling verification program featuring the complete Concise Edition of the Random House Dictionary for Apple II and Apple II Plus
\$125

Sensible Software
West Bloomfield, MI 48033
see story on page 230
mail order
CIRCLE 333

SG-PLOT
features higher-level statistical routines which create displays of user-specified quantitative and labeled data such as pie charts, bar graphs, #D bar graphs and line drawings for CP/M- and MP/M-based systems
\$450

Selanar Corp.
Santa Clara, CA 95050
mail order
CIRCLE 332

Target Image Maker
allows slide production over ordinary telephone lines for Apple II
\$175 plus \$10 per color slide

Comshare Inc.
Ann Arbor, MI 48106
retail
CIRCLE 334

TelePlan
helps executives, managers and other professionals in resource planning, forecasting and modeling for CP/M-based systems
\$995

Televideo Systems Inc.
Sunnyvale, CA 94303
see story on page 222
retail
CIRCLE 333



Financial Armor

Protect your success with Quality Software from CMA

APPLE II - APPLE /// - TRS-80 - IBM

CMA

Micro Computer Division
55722 Santa Fe Trail
Yucca Valley, CA 92284
(714) 365-9718

CIRCLE 151

SOFTWARE INDEX

Tax Byte
tax preparation program that eliminates mathematical errors and omissions and guarantees data security and compliance with tax regulations for Z-80-based systems
\$750

Income Tax Specialty Co.
Far Rockaway, NY 11691
retail and mail order
CIRCLE 336

VictorWriter II
handles the creation and revision of documents and document merges and appendages for Victor 9000
\$645

Victor Business Products
Chicago, IL 60618
retail
CIRCLE 337

WRITE/IDEA
features full screen editing with cursor controls and single keystroke commands, decimal tabbing, multiple file merging and queuing of multiple files for automatic printout for HP Series 80
\$250

Threshold Software Inc.
Sacramento, CA 95815
mail order
CIRCLE 338

(continued on page 244)

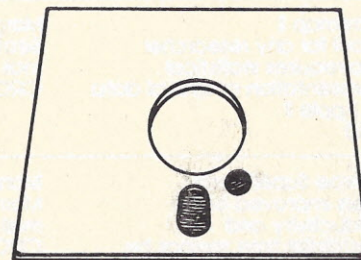
\$1000 WORTH OF PROGRAMS



THE NIBBLE COPIER THAT DOES IT ALL And A Whole Lot More...

BACK IT UP II has been improved and enhanced to provide the end user with the most powerful duplication system for the Apple II computer. Multiple parameter changes allow easy adaptation to the latest protection techniques.

\$60 WORTH OF INSURANCE



BACK IT UP II+

This program is intended for the sole use of the computerist who wishes to back-up his/her diskette library. SENSIBLE SOFTWARE, INC. has a very liberal \$7.50 disk update/replacement policy.

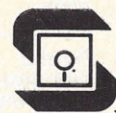
Sensible Software

6619 Perham Drive, Dept. PC
West Bloomfield, Michigan 48033
(313) 399-8877

Visa and Mastercard Welcome.

Add \$1.25 postage and handling per diskette.

For a complete catalog, send \$1.00, refundable with your first purchase.



CIRCLE 44

We Guarantee That Anyone Can Create Professional-Quality Applications with Quic-N-Easi.



15 Day FREE TRIAL...You're Delighted or Your \$195 Back.

No matter who you are. Or your level of computer expertise. *You can create your own applications right on the screen. The fill-in-the-blanks Quic-N-Easi way.*

The results you get with Quic-N-Easi are so amazing, we're confident enough to let you **try it FREE**. On your own computer. Then, you be the judge.

Non-Programmers

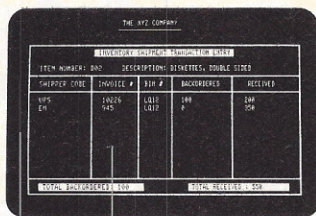
If you are not a programmer, listen closely. All you need is **Quic-N-Easi (\$195)** to implement your own custom applications without programming. What's more, your applications will look professional. Run Perfectly. And do exactly what you want them to do.

Programmers

If you happen to be a programming pro, take note that Quic-N-Easi eliminates 50%, 70%, even 90% of the time required to implement commercially viable programs. And the added advanced capabilities of **Quic-N-Easi PRO** insure that you'll never outgrow the System.

How Quic-N-Easi Works

Quic-N-Easi provides a non-programming way to personalize and interconnect preprogrammed building blocks of software that are common to all applications. *If you know your applications, you just follow the guide book to interconnect the building blocks you need by filling in the blanks right on the screen. Presto, you've got your software: formatted screens, file management and generated reports. All in one.*



Your Input Screens and Output Reports Look Professional, Like These Examples

All The Applications You Want
Quic-N-Easi is the only easy to use applications development system that produces professional looking programs.

Keep track of your inventory . . .

Or your record collection.

Manage project development costs . . .

Or your weekly grocery budget.

Track you sales . . .

Or handicap the races.

Whatever your application or programming skills, you can implement them all yourself, in a small fraction of the time with Quic-N-Easi.

PART NO.	DESCRIPTION	QTY	PRICE	TOTAL
01-001	WHEELS GREEN	12	95	1140
01-002	WHEELS YELLOW	12	95	1140
01-003	WHEELS RED	12	95	1140
02-001	CARBON SHIPPING	1	100	100
02-002	CARBON ACCESSORY	1	100	100
02-003	PACKAGE INSTRUCTIONS	1	100	100
03-001	POWER	1	100	100
03-002	SIGNAL	1	100	100
03-003	WHEELS MOUNT	1	100	100
03-004	HANDLE LIFTING	1	100	100

Order Your Free Trial Now

To take advantage of this exceptional risk-free Quic-N-Easi offer, see your local dealer today or call **(215) 968-0689**.

■ **Quic-N-Easi (Application Generation System)**
Price \$195*

■ **Quic-N-Easi PRO (Professional Development Language)**
Price \$395*

■ **Both for \$495***

Sales Tax - in PA add 6%,
In NJ add 5%.

Shipping - U.S. and Canada
add \$4.50; all others \$20.00.

■ **System Requirements**
CP/M, Z80, 48K, Floppy Disks

■ **Disk Formats** 8" Single Sided,
Single Density IBM and Most 5 1/4" Formats

***Can't Lose Proposition** If not 100% satisfied, return within 15 days for refund of full purchase price and tax.



QUIC-N-EASI™

Standard Microsystems Inc.

136 Granite Hill Court, Langhorne, PA 19047

(215) 968-0689

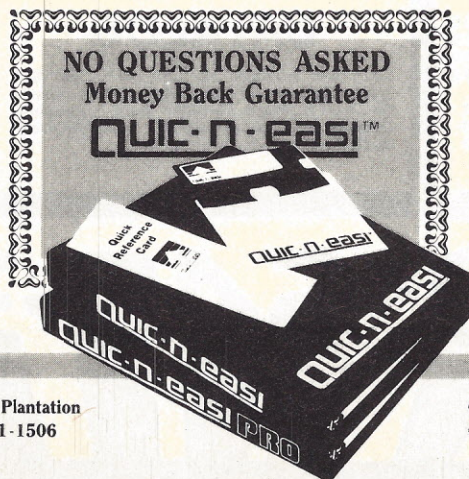
Z80 is a trademark of Zilog, Inc.
CP/M is a registered trademark of Digital Research, Inc.

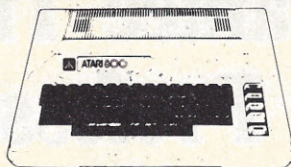
Quic-N-Easi Distributors of the Month

The Bottom Line Software Distributor (603) 673-8857
Software Plantation (206) 531-1506

Germany -
Call 49-2173-52071/2

Canada -
Compu-Ware Services, Inc.
(416) 667-9981





400

16K ... \$249
32K ... \$369
48K ... \$469

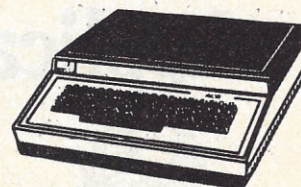
410 Recorder \$76.00
810 Disc Drive \$449.00
822 Printer \$269.00
825 Printer \$589.00
830 Modem \$159.00
830 Printer \$259.00
850 Interface \$169.00
CX40 Joy Stick \$18.00
CX853 16K RAM \$77.95

800

16K ... \$649
32K ... \$724
48K ... \$769

Microtek 16K RAM \$74.95
Microtek 32K RAM \$119.95
Ramdisk (128K) \$429.95
Intec 48K Board \$219.95
Intec 32K \$119.95
One year extended warranty \$70.00
481 Entertainer \$69.00
482 Educator \$130.00
483 Programmer \$49.00
484 Communicator \$344.00

FRANKLIN ACE 1000



64K Personal Computer
Hardware, software and peripheral compatible with the Apple II and even has some features not found on the Apple.

MICRO-SCI Apple II/Franklin compatible Disk Drives!

Call now for best price!!

HOT ATARI GAMES

PAC-MAN \$35.00
Centipede \$35.00
Caverns of Mars \$32.00
Asteroids \$29.00
Missile Command \$29.00
Star Raiders \$39.00
Canyon Climber \$25.00
Protector \$24.00
Mouskattack \$31.00
Jawbreaker \$27.00
Ghost Hunter \$24.00

K-BYTE ROM CARTRIDGE GAMES FOR YOUR ATARI

Krazy Shoot Out \$39.00
K-razy Kritters \$39.00
K-razy Antics \$39.00
K-star Patrol \$39.00

STICK STAND

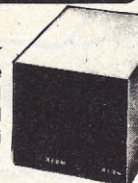
\$6⁹⁹

ARCADE ACTION FROM YOUR
ATARI JOYSTICK



PERCOM

Finally, a dual disk drive for the Atari 800/400. Both single and dual drive models read both sides of the disk! Will read all disks written for Atari 810. **CALL FOR INTRODUCTORY PRICE!**



Telecommunications Modems

Hayes
Smart \$239.00
Chronograph \$199.00
Micromodem II \$279.00
Micromodem 100 \$309.00
Novation Auto \$239.00
D Cat \$169.00
Cat \$159.00
Anchor Modem \$79.00

AMDEK MONITORS

300G \$169.00
Color I \$339.00
Color II \$699.00
Color III \$429.00

OTHERS

Zenith 9" (Green) \$109.00
BMC 12" Green \$85.00

NEC COMPUTERS

8001-A \$749.00
8031 \$749.00
8012 \$549.00

PRINTERS

8023 \$549.00
7710/7730 \$2399.00
3510/3530 \$1789.00

MONITORS

JB-1201 \$179.00
JC-1201 \$349.00
JC-1202 \$899.00
SANYO 1000 COMPUTER \$1599.00

VISICORP

VISICALC
Apple II+ \$189.00
Atari \$189.00
Commodore \$189.00
IBM \$189.00

Also available are:

VISIDEX
VISIFILE
VISIPACK

VISIPLOT
VISITERM
VISITREND

SOFTWARE

We stock manufacturer's and third party software for most all computers on the market! Call today for a copy of our new

CATALOG

You'll find programs by Atari, APX, Data Soft, Crystal Software, EPYX, Synapse, OnLine, Arcade Plus, K-BYTE, Magis, Canadian Micro, Professional Software, Creative Software, BPI, VISICORP, Commodore, NEC and of course our own!

Maxell Disks

MD I (box of 10) \$36.00
MD II (box of 10) \$46.00
MFD I (8") \$44.00
MFD II (8" Double Density) \$54.00
Syncom (box of 10) \$29.00

Computer Covers

Atari 400 \$6.99
Atari 800 \$6.99
Atari 810 \$6.99
Commodore VIC-20 \$6.99
Commodore 8032 \$14.99
Commodore 8050/4040 \$10.99

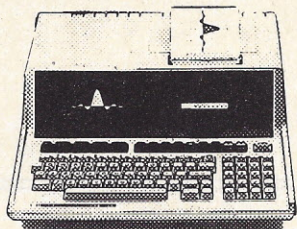
west

CIRCLE 152

In Nevada
CALL
(702)588-5654

800-648-3311

P.O. Box 6686
Stateline,
NV. 89449



HP-85 \$1969

HP-87	\$1799.00
HP-125	\$1999.00
HP-85 16K Memory Module	\$169.00
5 1/4" Dual Master Disc Drive	\$1799.00
Hard Disk w/ Floppy	\$4349.00
Hard Disk	\$3549.00
"Sweet Lips" Plotter	\$1199.00
80 Column Printer	\$649.00



CBM 8032 \$999



Commodore Business Machines

CBM 64	CALL
4032	\$969.00
8096 Upgrade Kit	\$369.00
Super Pet	\$1599.00
2031	\$529.00
8250 Doubled Sided Disk Drive	\$1699.00
D9060 5 Megabyte Hard Disk	\$2399.00
D9090 7.5 Megabyte Hard Disk	\$2699.00
8050	\$1299.00
4040	\$969.00
8300 (Letter Quality)	\$1799.00
8023	\$769.00
4022	\$499.00
Pet to IEEE Cable	\$37.00
IEEE to IEEE Cable	\$46.00
Tractor Feed for 8300	\$240.00



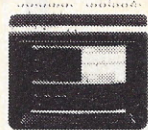
HP 41CV CALCULATOR \$239



HP 41C	\$189.00
HP 11C	\$79.00
HP 12C	\$114.00
NEW 15C	\$119.00
NEW 16C	\$125.00

HPIL PERIPHERALS IN STOCK!

Teletype Terminals



910	\$579
912C	\$699
920C	\$749
925C	\$749
960	\$950

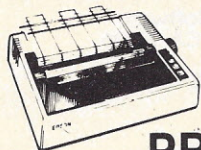
802	\$Call
802H	\$Call
816	\$Call
806	\$Call

VIC 20

\$179



VIC 1530 Commodore Datasette	\$69.00
VIC 1540 Disk Drive	\$499.00
VIC 1515 VIC Graphic Printer	\$339.00
VIC 1210 3K Memory Expander	\$32.00
VIC 1110 8K Memory Expander	\$53.00
16K VIC Expansion	\$94.00
VIC 1011 RS232C Terminal Interface	\$43.00
VIC 1112VIC IEEE-488 Interface	\$86.00
VIC 1211 VIC 20 Super Expander	\$53.00
VIC Mother Board	\$99.00



EPSON PRINTERS

MX 80 w/Graftrax	\$449
MX 80 FT III	CALL
MX 100	CALL
ADA 1600 Parallel Printer to CBM	\$119.00
ATC-1 Parallel Printer to Atari	\$29.00
AP-80 Apple Parallel Card & Cable	\$69.00
IBM-1 Parallel Printer to IBM	\$32.00



TEC PRINTERS

Starwriter	
F10-40CPS	\$1399.00
F10-55CPS	\$1749.00
Prowriter 8510A	\$499.00
Prowriter 1550	\$799.00
ADA 1450 Serial Printer to CBM	\$119.00
ATC-2 Serial Printer to Atari	\$29.00
AP-S10 Apple Serial Card & Cable	\$95.00

Smith-Corona

TP-I

\$649



Letter Quality
Daisy Wheel
12 CPS Text Printer

In-stock items shipped same day you call. No risk, no deposit on C.O.D. orders. Pre-paid orders receive free shipping within the continental United States with no waiting period for certified checks or money orders. All advertised prices include a 3% cash discount from normal credit card prices. NV and PA residents add sales tax. All items subject to availability and price change.

CENTRONICS PRINTERS

739-1	\$519
739-3	\$619
2 Meter RS232-RS232 Cables	\$29.95

— ALSO —	
Diablo 630 Special	\$1799.00
Talley 8024-L	\$1629.00
IDS Prism	CALL
Daisywriter	CALL

OKIDATA PRINTERS

82A	\$469.00
83A	\$599.00
84 Parallel	\$1099.00
84 Serial	\$1249.00

NOTE

Okidata 82A and 83A Printers come equipped with both parallel ports & RS232 Serial ports.

ADDITIONAL MANUFACTURER'S DISCOUNTS AVAILABLE TO QUALIFIED EDUCATIONAL INSTITUTIONS

800-233-8950 east

477 E.
THIRD ST.
Williamsport
PA 17701

IN PA
CALL
(717)327 9575

computer mail order east

Computer

DISCOUNT PRODUCTS

OKIDATA

MICROLINE	349
MICROLINE 82A	449
MICROLINE 83A	699
MICROLINE 84	\$CALL

EPSON

MX 80 F/T III	499		
MX 80 III	\$CALL	IBM PC CABLE	40
MX 100 III	\$CALL	MX 80 RIBBONS	10
APPLE INTERFACE	89	Buffered Interface	\$CALL
ATARI CABLE	25		

APPLE

APPLE II+, 48K	1099
APPLE DISK II w/cntrlr	529
APPLE DISK II w/o	449
HAYES MICROMODEM II	289
KEYBOARD CO. Numeric keypad	125
KEYBOARD CO. Joystick	45
KEYBOARD CO. Paddles	30
LOBO 5 1/4" Drive w/cntrlr	479
LOBO 5 1/4" Drive w/o	379
MICROSOFT SOFTCARD	249
M&R RF Modulator	28
M&R Sup-R-Term 80 column	279
MTN Computer CPS	169
MTN Computer Ramplus+	139
MTN Computer (All Products) \$CALL	
SATURN 64K Ram Card	355
SATURN 128K Ram Card	500
TG Joystick	40
VIDEX 80 Column	279
VIDEX Enhancer II	129
VIDEX Function Strip	69
VIDEX Softswitch	30
VISTA Vision 80	269
VISTA Type-Ahead-Buffer	35
VISTA GB75 IBM Typewriter I/O	169

ATARI®

MODEL 800 (16K)	649
MODEL 400 (16K)	299
16K Memory Expansion	55

SOFTWARE

We carry all software advertised in this magazine, and we will beat any price.

VISICALC (IBM or Apple)	179
WORDSTAR 8" CP/M	269
WORDSTAR (Apple)	219
DB MASTER (Apple)	178
PRO EASY WRITER (Apple)	135
EASY WRITER (IBM)	279
APPLE WRITER II	99
BPI	295

SMITH-CORONA TPI

DAISY WHEEL PRINTER **635**

We will beat any advertised price

BASIS 108

Apple Compatible Computer

Call for lowest price.

MONITORS

BMC 12" Green 12AU	99
BMC 12" Green 12EU	129
NEC 12" Green	179
NEC Color	335
Amdek Color	\$CALL

VERBATIM

5 1/4" 10-25 ⁹⁵	100-239 ⁹⁵
8" 10-\$CALL	100-\$CALL

16k RAM CARD FOR APPLE

\$59

2YR. WARRANTY

Computer

DISCOUNT PRODUCTS

860 S. Winchester Blvd.
San Jose, CA 95128

Retail Store Hours:
Mon-Fri 8-5 Sat 10-4

Mail and Phone Orders Welcome. CA residents add 6 1/2% Tax. Prices subject to change. All items FOB San Jose. VISA, MC, AMEX, MO, CASHIERS CHECK, C.O.D. OK. Personal checks allow 2 wks for processing. School PO's accepted.

DEALER INQUIRIES INVITED
(408) 985-0400

SOFTWARE INDEX

(continued from page 240)

EDUCATIONAL

Class Records
a comprehensive classroom
management system
for Apple II and III
\$89.95

Educational Systems
Software
El Toro, CA 92630
retail or mail order
CIRCLE 340

Classroom Monitor
allows the teacher to set up
a programming demonstration
on one student's computer and
allow all other students to
monitor that screen on their
own computers
for Apple II
\$375

Software Connections, Inc.
Santa Clara, CA 95054
retail
CIRCLE 341

Computer Comprehension
Games
focuses on important reading
skills; 20 games in the series
for Apple II
\$49.95 each

Learning Well
Roslyn Heights, NY 11517
mail order
CIRCLE 342

MasterType
consists of seventeen
progressive lessons allowing
individuals to develop mastery
of the keyboard at their
own rate
for Atari 400, 800 and Apple II
\$39.95

Lightning Software
Palo Alto, CA 94306
retail
CIRCLE 343

Mathfun!
makes substantial use
of color, sound, graphics, and
animation to help motivate
children
for Atari 400 and 800
from \$29.95

Milliken Publishing Co.
St. Louis, MO 63132
retail
CIRCLE 344

MicRo Hangman
the traditional word guessing
game that combines
entertainment with a
spelling drill
for VIC 20
\$9.95

M-R Information
Systems, Inc.
Wayne, NJ 07470
mail order
CIRCLE 345

MicRo Math Blaster
combination of arcade game
and basic mathematic drill
in addition, subtraction,
multiplication and division
for TRS-80 Model III
\$15.95

M-R Information
Systems, Inc.
Wayne, NJ 07470
mail order
CIRCLE 346

MicRo Quiz II
subject independent CAI
authoring package
with class evaluation features
for TRS-80 Model III and
VIC 20
\$39.95

M-R Information
Systems, Inc.
Wayne, NJ 07470
mail order
CIRCLE 347

SHUTTLE INTERCEPT



A New, Exciting Challenge from Hayden

Houston needs some satellites retrieved . . . a true test of skill, speed, and reflex!

It's non-stop excitement as you try to intercept friendly satellites with your shuttle hook, dodging asteroids, flying saucers, hostile satellites, comets, and guided missiles that are attacking faster and faster!

Warning: SHUTTLE INTERCEPT MAY BE ADDICTING!
Surviving play testers rate this a #1 Challenge!

to order call:

1-800-631-0856 Dept. #PC02
(in N.J. call 201-843-0550, ext. 382).

SHUTTLE INTERCEPT, #19009, Apple II disk, \$34.95

HAYDEN SOFTWARE

CIRCLE 154

SOFTWARE INDEX

MicRo Spell II
a comprehensive graded spelling drill package. Includes words most frequently misspelled by students grades 3 through 7 for VIC20 and TRS-80 Model III \$24.95

Supermath II
an enhanced version of the popular elementary math program already in use for Apple II and III \$39.95

M-R Information Systems, Inc.
Wayne, NJ 07470
mail order
CIRCLE 348

Educational Systems Software
El Toro, CA 92630
retail or mail order
CIRCLE 349

for IBM Personal Computer and Apple II \$175

AP-PAK
features an unlimited number of character fonts, variable type sizes, and precision dot-addressable graphics for Z89 and Z90 \$55

Micro Peripherals Inc.
Salt Lake City, UT 84107
retail
CIRCLE 351

C88
consists of a compiler for the C language, a linkage editor and extensive library of useful functions for IBM Personal Computer \$250

Intellect Associates
Holbrook, NY 11741
mail order
CIRCLE 352

COBOL Program Generator
streamlines business application programming by automatically generating error-free ANSI 74 COBOL code for VT180, Rainbow 100, DECmate II and Professional 300 \$1495

Digital Equipment Corp.
Maynard, MA 01754
retail
CIRCLE 353

UTILITY

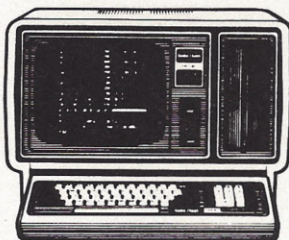
Advanced Systems Editor (ASE)
features the capability of editing very large files, function keys that can be easily trained, selection by menu, the ability to edit a new file while still in another and simplified keystroke sequences

Volition Systems
Del Mar, CA 92014
see story on page 222
mail order
CIRCLE 350

(continued on page 250)

✓ CHECK US FIRST! for DISCOUNT TRS-80® COMPUTERS

BUY DIRECT



- ✓ No Out-of-State - Taxes - Kansans Add 4%
- ✓ Large Inventory for Immediate Shipment
- ✓ 100% TRS-80® Equipment
- ✓ Convenient Order Number
- ✓ F-48 Form Provided

TRS-80
CALL US FOR
OUR PRICES
and PRICE List

1-800-835-9056

- ✓ Visa, Mastercard
- ✓ Wire Transfers
- ✓ Bank Cashier's
Checks & Money
Orders.

Jimscot, Inc.

1023 N. Kansas
P.O. Box 607
Liberal, Ks. 67901

Kansas Residents:
316-624-1919 (Collect)

TRS-80 is a registered Trademark of Tandy Corp.

WE WILL NOT BE UNDERSOLD

SOFTWARE

MICROPRO	
Wordstar	\$239.00
Mailmerge	89.00
Customization Notes	\$359.00
Spellstar	\$239.00
Datastar	\$199.00
Calcstar	\$199.00
MICROSOFT	
Basic Interpreter	\$349.00
Basic Compiler	\$389.00
Fortran 80	\$499.00
Cobol 80	\$695.00
DATA BASE	
FMS80	\$595.00
dBase II	\$599.00

NEW! IBM PC SOFTWARE NEW!

INFORMATION UNLIMITED	
Easy Writer	\$289.00
Easy Speller	\$149.00
Easy Filer	\$319.00
VISICORP	
Visicalc 256K	\$199.00
VisiDex	\$199.00
VisiFile	\$229.00
VisiTrend/VisiPlot	\$229.00
MICROPRO	
Wordstar	\$239.00
MISCELLANEOUS	
Supercalc by Sorcim	\$229.00
Superwriter by Sorcim	\$289.00
Home Accountant Plus	\$139.00
ENTERTAINMENT	
Deadline	\$39.00
Temple of Apshai	\$29.00
Curse of Ra	\$15.99
Call For More IBM Software And Accessories	

DISK DRIVES

CCI 100 for the TRS-80 Model 1	
5 1/4 40 track	\$299.00
CCI 189 for the Zenith Z-89	
5 1/4 40 track	\$379.00
CORVUS 5M with Mirror	\$3089.00
CORVUS 10M with Mirror	\$4489.00
CORVUS 20M with Mirror	\$5389.00
CORVUS Interfaces	CALL
RANA SYSTEMS add-on Disk Drive for the Apple II	
Elite One 40 Track	CALL
Elite Controller	CALL
Elite Two 80 Track	CALL
Elite Three 80 Track double-sided	CALL

DISKETTES

Maxell 5 1/4 single side	\$39.00
Maxell 8 single side	\$49.00
Maxell 5 1/4 double side	\$45.00
Maxell 8 double side	\$55.00
BASF 5 1/4	\$26.95
BASF 8	\$36.00
Verbatim 5 1/4	\$26.95
Verbatim 8	\$36.00
Wabash 5 1/4	\$24.95
Wabash 8	\$29.95

IBM PC ACCESSORIES

64K Card by Microsoft	\$435.00
Joystick by T & G	\$49.00
128K Card	\$579.00
192K Card	\$629.00
256K Card	\$699.00
Combo Card by Apparat	\$249.00
Call for more IBM PC add-ons	

For fast delivery, send certified checks, money orders, or call to arrange direct bank wire transfers. Personal or company checks require one to three weeks to clear. All prices are mail order only and are subject to change without notice. Call for shipping charges.

APPLE SOFTWARE

MICROPRO	
Wordstar	\$199.00
MailMerge	\$89.00
Spellstar	\$149.00
DataStar	\$199.00
Calcstar	\$189.00
Supersort I	\$159.00
VISICORP	
VisiCalc	\$199.00
VisiTerm	\$79.00
VisiDex	\$199.00
VisiPlot	\$169.00
VisiFile	\$199.00
VisiSchedule	\$259.00
VisiTrend/Plot	\$239.00
VisiPac	\$539.00
MISCELLANEOUS	
Micro Courier	\$219.00
Screen Director	\$129.00
Executive Briefing System	\$169.00
Supercalc	\$199.00
Personal Filing System	\$115.00
PFS Report Writer	\$75.00
Word Handler	\$169.00
CP/M Power	\$59.00
ENTERTAINMENT	
Wizard and Princess	\$29.00
Twerps	\$28.00
Beer Run	\$28.00
Zork I, II	\$26.95
Deadline	\$39.00
Chop Lifter	\$24.95
Pinball	\$24.95
Cannonball Blitz	\$29.95
Knights of Diamonds	\$29.95
Midnight Magic	\$32.00
Wizardry	\$45.00
Time Zone	\$79.00
Tuesday Morning Quarterback	\$24.95
Crush, Crumble & Chomp	\$24.95
Datstones of Ryn	\$15.99
Morloc's Tower	\$15.99
Star Warrior	\$31.99
Snack Attack	\$23.95
Star Blazer	\$24.95
Kabul Spy	\$29.95
Cyclod	\$23.95

APPLE ACCESSORIES

ADVANCED LOGIC	
Add-Ram 16K Card	\$99.00
Z-Card CP/M for the Apple II	\$225.00
Smarterm 80 Column Board w/Softswitch	\$249.00
The Synergizer	
All of the above plus "The CP/M Handbook"	\$545.00
Z-80 Card by Microsoft	\$319.00
16K Card by Microsoft	\$159.00
32K Card by Saturn	\$199.00
Keyboard Enhancer II by Videx	\$125.00
Videoterm by Videx	\$259.00
Game Paddles by TG	\$49.00
Joystick by TG	\$49.00
Numeric Keypad by Keyboard Co.	\$139.00
ALF 9 Voice Board	\$159.00
ALF 3 Voice Board	\$229.00
System Saver by Kensington	\$75.00
Versacard by Prometheus	\$229.00
8088 Card by Coprocessor	\$789.00
Microbuffer II 16K w/graphics	\$259.00
Microbuffer II 32K w/graphics	\$299.00
APPLE INTERFACE CARDS BY CCS	
Serial Asynch. #7710	\$139.00
Serial Synch. #7712	\$149.00
Call for other CCS cards	

RAM

16K Ram Kit for Apple II; TRS80	\$17.50
200 nano seconds, 4116 chips	

COMPUTERS

CALIFORNIA COMPUTER SYSTEM	
Mainframe 2200a	\$485.00
Z-80 CPU 2810a	\$265.00
64K RAM 2065	\$569.00
Floppy Controller 2422a	\$359.00
ZENITH	
Z-89 48K	CALL
Z-90 64K	CALL
Call For Prices On The Complete Zenith Line	
CASIO FX702P Pocket Computer	\$179.00
Sanyo MBC 1000 64K	CALL
Call For Prices On Complete Sanyo Computer Line	

PRINTERS

NEC 7710 Serial	\$2395.00
NEC 7720 KSR	\$2749.00
NEC 7730 Parallel	\$2395.00
NEC 3510 Serial	\$1850.00
NEC 3530 Parallel	\$1850.00
NEC 8023 Dot Matrix 100cps	\$539.00
Olivetti DY211 Letter Quality	
Daisy Wheel Printer	\$1095.00
Parallel Only	\$995.00
Epson MX-80	CALL
Epson MX-80FT	CALL
Epson MX-100	CALL
IDS 560	CALL
IDS Prism 80	CALL
IDS Prism 132	CALL
Okidata Microline 80	CALL
Okidata Microline 82A	CALL
Okidata Microline 83A	CALL
Okidata Microline 84	CALL
Centronics 739	\$675.00
Datasouth 180 cps	CALL
Zenith Z-25 150 cps	CALL

MONITORS

Amdek 12" B & W	\$109.00
Amdek 13" Color	\$329.00
Sayno 9" B&W	\$135.00
Sanyo 9" Green	\$140.00
Sayno 12" B&W	\$179.00
Sayno 12" Green	\$189.00
Sanyo 13" Color	\$359.00
Zenith 12" Green	\$95.00
Zenith 13" Color	\$339.00
Electrohome 13" HI-RES	
Color Monitor	\$829.00
Electrohome 13" Color	\$349.00
Electrohome 12" B&W	\$179.00
Electrohome 12" Green	\$189.00
Electrohome 9" B&W	\$149.00
Electrohome 9" Green	\$159.00

SPECIAL OF THE MONTH

RANA SYSTEMS

add-on disk drive for Apple II
Elite One 40 track **CALL**

TERMINALS

ADDS Viewpoint	\$495.00
Zenith Z-19	\$679.00
Televideo 910	\$595.00
Televideo 925	\$779.00
Televideo 950	\$969.00

TELECOMMUNICATIONS

Prentice Star Modem	\$129.00
Novation Cat Modem	\$139.00
Novation D-CAT	\$149.00
Novation AUTO-CAT	\$199.00
Novation APPLE CAT	\$299.00
Hayes Smart Modem	\$249.00
Hayes Micro-Modem	\$295.00
Hayes Chronograph	\$225.00



The CPU Shop

TO ORDER CALL TOLL FREE 1-800-343-6522

420-438 Rutherford Ave., Dept. PE10, Charlestown, Massachusetts 02129



Hours 9 AM - 9 PM (EST) Mon.-Fri. (Sat. till 6)
Technical information call 617/242-3361

TWX- 710-348-1796

CIRCLE 179

Massachusetts Residents call 617/242-3361
Massachusetts Residents add 5% Sales Tax

apple *Fest*

A P P L E E U P H O R I A

"Absolutely the best show I've ever been to in my life."

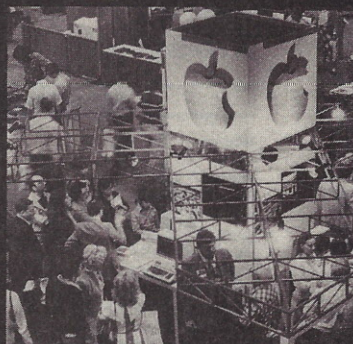
"It was incredible—I never knew there were so many products available for the Apple."

These are some of the things people are saying about Applefest, the world's largest exposition of Apples and Apple compatible products.

At Applefest, you can see and try out everything new for your Apple. Software for every conceivable application from arcade games to investment programs, music to machine language, teaching systems to accounting packages, word processors to graphics processors. Hundreds of peripherals, including printers, hard disks, modems, memory cards,

video displays and synthesizers, plus accessories, publications, support services and more! Over 5,000 products are displayed and available for purchase at super show prices.

Get a taste of Apple Euphoria. Don't miss Applefest when it comes to a city near you.



Applefest/Minneapolis

Thursday-Sunday
September 16-19, 1982
Minneapolis Auditorium

Admission: Adult \$5 per day, Child \$3 per day

Show Hours: Thurs. 11 AM to 7 PM, Fri. and
Sat. 11 AM to 7 PM, Sun. 12 NOON to 6 PM

Applefest/Houston

Thursday-Sunday
October 28-31, 1982
Houston Civic Center

Admission: Adult \$5 per day, Child \$3 per day

Show Hours: Thurs. 11 AM to 7 PM, Fri. and
Sat. 11 AM to 7 PM, Sun. 12 NOON to 6 PM

Applefest/San Francisco

Thursday-Sunday
November 18-21, 1982
Brooks Hall

Admission: Adult \$6 per day, Child \$3 per day

Show Hours: Thurs. 11 AM to 7 PM, Fri. and
Sat. 11 AM to 9 PM, Sun. 12 NOON to 6 PM



For information on exhibit space or tickets, call or write:
Northeast Expositions, 824 Boylston Street, Suite 202, Chestnut Hill, MA 02167 (617-739-2000)

TRS-80[®]

COMPUTERS

**CONSUMER
DISCOUNT
PRICES**

BUY DIRECT
PURE RADIO SHACK EQUIPMENT
LOW **DISCOUNT** PRICES

**BUY DIRECT
SAVE
MONEY**

~ MICRO MANAGEMENT SYSTEMS, INC. ~

TRS-80 **DISCOUNT PRICED FROM**
COLOR COMPUTER.....\$299
MODEL III.....\$609

TRS-80 **DISCOUNT PRICED FROM**
MODEL II.....\$2988
MODEL 16.....\$4158

We offer you the total package.....

- SATISFACTION..... thousands of satisfied customers since 1978!
- PRICE..... consistently offer the best value! Save money
- HONESTY..... no gimmicks, no worry - mail order ease!
- INVENTORY..... large, full line to assure fast delivery!
- RELIABLE PRODUCTS..... backed by major Name Brand manufacturers!
- ALL U.S.A. SHIPMENTS..... are fully insured against damage or loss!
- TOLL FREE PHONES..... doesn't cost you a penny to call us!

CALL US TOLL FREE FOR YOUR DISCOUNT PRICES!

WRITE FOR FREE CATALOG

ATARI

CENTRONICS[®]

TRS-80
PERSONAL COMPUTERS
PRINTERS
SOFTWARE
Smith-Corona[®]
DAISY WHEEL

SONY[®]
FRANKLIN

Commodore
COMPUTER

MICRO MANAGEMENT SYSTEMS, INC.

PARCEL DIVISION - DEPT. NO. 9
2803 Thomasville Road East • Cairo, Georgia 31728
GA. & INFO 912-377-7120

All **TRS-80** Equipment is Pure Radio Shack Factory Built. Free copy of Radio Shack
Warranty available upon request. TM - Tandy Corporation

ORDER TOLL FREE 1-800-841-0860

SOFTWARE INDEX

(continued from page 246)

Colortext
a high-resolution text driver
which displays a variety of
character fonts and graphics
on the screen simultaneously
for TRS-80 color computer
\$79.80

CO-SORT
sorting routine that can be
accessed from all languages,
allows fixed or variable length
records, all data types and any
number of keys in any direction
for CP/M-based systems
\$200

DIRFIX
allows you to recover from
damaged disk directories and
accidentally removed disk files
for Apple II and Apple II Plus
\$35

Disk-Edit
allows the user to access raw

Bertamax Inc.
Seattle, WA 98109
mail order
CIRCLE 354

Information Resources
Manhasset, NY 11030
mail order
CIRCLE 355

Seven Mile
Systems Inc.
The Dalles, OR 97058
mail order
CIRCLE 356

SuperSoft Assoc.
Champaign, IL 61820

files directly from disk that
are not accessible with a
normal text editor
for CP/M-based systems
\$100

mail order
CIRCLE 357

DOSPLUS II
features complete device
independence
for TRS-80 Model II
\$249.95

Micro Systems
Software Inc.
Hollywood, FL 33023
retail
CIRCLE 358

Dual Tasking FORTH
permits simultaneous execution
of two programs
for Z-80-based systems
\$285

Timin Engineering Co.
San Diego, CA 92122
mail order
CIRCLE 359

ES-CAPE
a programmer's tool to speed
up and simplify the development
of Applesoft BASIC programs
for Apple II
\$40

S-C Software Corp.
Dallas, TX 75228
mail order
CIRCLE 360

Our Name Means a Great Deal

NEC

Commodore



**APPLE II COMPATIBLE
Accessories**

VIC-20

ATARI



PC-6000
Please call for details.

PC-8001A Microcomputer (32K) CALL
PC-8012A Dual mini-disk drives CALL
PC-8012A IO unit, 32K, 7 slots 489⁹⁹
NEC 8023 Printer 489⁹⁹
32K Memory Add-on card 179⁹⁹
RenTec RS-232 card for NEC 155⁹⁹
RenTec Wedge Expansion w/32K 489⁹⁹

NEC SOFTWARE

NEC CP/M Operating System 125⁹⁹
General Accounting System 249⁹⁹
Accounts Receivable System 249⁹⁹
Inventory Control System 249⁹⁹
Payroll System 249⁹⁹
Job Cost System 249⁹⁹
Select Word Processing w/Speller 349⁹⁹
Report Manager 149⁹⁹
Games Pack 1 Alien, Space War 29⁹⁹
Games Pack 2 UFO, Galaxian, Bomber 29⁹⁹
Wordstar by Micropro 299⁹⁹
Datastar by Micropro 249⁹⁹
Mailmerge for NEC Wordstar 109⁹⁹
Supersort by Micropro 169⁹⁹
Racet NECDOS 169⁹⁹
CALL
More software and accessories everyday.

SANYO
computer
Please call for details.

ADDIS
TeleVideo

**We are a full-line
Commodore Dealer.**

Please Call for More Information

**IBM COMPATIBLE
ACCESSORIES**

64K memory card by microsoft 379⁹⁹
128K memory card by 499⁹⁹
192K memory card by 659⁹⁹
256K memory card by 799⁹⁹
64K ram chip upgrade kit 169⁹⁹
Serial Async. Comm. card w/1 port 129⁹⁹
Serial Async. card with 2 ports 249⁹⁹
Clock Calendar card 105⁹⁹
Combo Card by Apparat 235⁹⁹
Joystick for IBM 55⁹⁹
Expansion Chassis CALL
Baby Blue Z-80 w/64K & CP/M CALL
Percom mini-floppy drives (add-on) CALL
Tandon TM 100 mini-floppy drives CALL

FRANKLIN

THE FRANKLIN ACE FEATURES

• Apple II Compatible
• 64K RAM User memory
• Upper and lower case
• Typewriter style keyboard
• Twelve key numeric pad
• Alpha lock shift key
• VisiCalc friendly
• 50 watt power supply
• Built in Fan
Please call or write
for more details.

BASIS

The BASIS 108 microcomputer features include both a Z-80 and 6502 processor, RAM capacity of 128K, 80 columns, upper/lower case, detachable keyboard, function keys, numeric keypad, and cursor block. It is completely compatible with all APPLE II hardware peripherals and software, along with being compatible with all CP/M based software.

PLEASE CALL US FOR MORE DETAILS

Prometheus VersaCard 219⁹⁹
CPS Multi-Function card 169⁹⁹
Hayes Micromodem II 289⁹⁹
Hayes Smartmodem 245⁹⁹
Novation Apple Cat modem 319⁹⁹
Videx VideoTerm 80 column card 245⁹⁹
Z-80 SoftCard by Microsoft 289⁹⁹
16K RamCard by Microsoft 159⁹⁹
ThunderClock/Calendar card 119⁹⁹
ALF 9 voice Music Card 149⁹⁹
Music System (16 voices) Mountain 299⁹⁹
Asynchronous Serial card by CCS 139⁹⁹
Grappler Printer Interfaces 139⁹⁹

APPLE II COMPATIBLE DISK DRIVES

A2 with controller 469⁹⁹
A2 w/o controller 399⁹⁹
A40 with controller 479⁹⁹
A40 without controller 389⁹⁹
A70 with controller 599⁹⁹
A70 without controller 499⁹⁹

SOFTWARE

VisiCalc 185⁹⁹
VisiFile (Data Base Manager) 185⁹⁹
VisiTrend/VisiPlot 199⁹⁹
VisiSchedule (New!) 239⁹⁹
VisiTerm 89⁹⁹
Tax Preparer by Howard Soft 119⁹⁹
Real Estate Analyzer by 119⁹⁹
DB Master 79⁹⁹
PFS: Personal Filing System 79⁹⁹
Peachtree Accounting Software CALL
Continental Accounting Pkgs. 199⁹⁹
WordStar by MicroPro 199⁹⁹
Microsoft Software: we carry it all!
Requires a Z-80 Soft-Card

**16K RamBoard
FOR APPLE II**



\$500⁰⁰
ASSEMBLED & TESTED \$69⁰⁰

The Friendly Computer



\$239

VIC 1540 Single Disk Drive 469⁹⁹
Datasette Cassette I/O unit 65⁹⁹
Joystick Controller (pair) 29⁹⁹
VIC 1515 Graphic Printer 329⁹⁹
VIC Super Expander 54⁹⁹
8K Ram Cartridge 49⁹⁹
16K Ram Cartridge 99⁹⁹
VIC RS-232C Terminal Interface 39⁹⁹
VICalc - Viable Calculator (T) 11⁹⁹
AMOK (C) 31⁹⁹
The Alien (8K/T) 19⁹⁹

MONITORS

Amdek Video 300 12" Hi-Res Green 169⁹⁹
Amdek Color II 13" Color w/audio 379⁹⁹
Amdek Color II Hi-Res RGB 769⁹⁹
Amdek Apple II DVM RGB card 169⁹⁹
NEC 12" Hi-Res Green monitor 79⁹⁹
NEC 12" Composite Color 349⁹⁹
NEC 12" Hi-Res RGB Color 799⁹⁹
Sanyo 9" Green monitor 179⁹⁹
Sanyo 12" B&W 189⁹⁹
Sanyo 13" Color Monitor 369⁹⁹
Zenith 12" Green monitor 119⁹⁹

**consumer
computers**



We accept most major credit cards, bank wire transfer, money orders, cashiers or certified checks and personal checks (10 days to clear). Unless prepaid with cash please add 5% shipping, handling and insurance (min. \$50.00). CA residents add 8% sales tax. Foreign customers please call for ordering information. All equipment is subject to price change and availability without notice. All equipment is new and complete with manufacturer's warranty. We have a 15 day satisfaction policy - call for details.

Atari 800 (16K) 679⁹⁹
Atari 800 w/32K 729⁹⁹ w/48K 769⁹⁹
Atari 400 (16K) 329⁹⁹
Bit 3 80 Column Card for 800 299⁹⁹
410 Program Recorder 79⁹⁹
810 Disk Drive 439⁹⁹
850 Interface Module 169⁹⁹
Atari Joysticks (pair) 20⁹⁹
Avion Ramcrum 32K module 149⁹⁹
Atari 16K Module by Microtek 69⁹⁹
EDU-PAKs Educational Tape Series CALL
Pac-Man (cartridge) 34⁹⁹
Centipede (cartridge) 34⁹⁹
We carry all ATARI software and hardware.

PRINTERS

C. Itoh F-10 40 CPS (parallel) 1399⁹⁹
C. Itoh F-10 40 CPS (serial) 1450⁹⁹
Epson MX-80 T Type III w/graph CALL
Epson MX-80 F Type III w/graph CALL
Epson MX-82 F Type III w/graph CALL
IDS Prism 132 with color 1589⁹⁹
NEC Spinwriters (most models) CALL
NEC 8032 Impact Dot Matrix 489⁹⁹
Okidata 83A's & 84A's 469⁹⁹
Okidata 83A's & 84A's CALL
Smith Corona Printer parallel 689⁹⁹

DISKETTES

Dyan 5 1/4" (Soft. 10 or 16 sectored) 10/39⁹⁹
Verbatim 5 1/4" (Soft. 10 or 16 sect.) 10/29⁹⁹
Scotch 3M 5 1/4" (Soft. 10 or 16 sect.) 10/26⁹⁹
Same as above in quantity of 100 245⁹⁹
Scotch 3M 5 1/4" Head Clean Kit (5" & 8") 29⁹⁹

CATALOG SALES

8338 Center Drive La Mesa, CA 92041

Toll Free 800-854-6654

Info & California 714 - 698-8088

Microtek Products Make Small Computers Act Big.

Microtek Products are the performance additives your computer has been looking for.

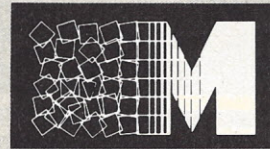
When you reach for Microtek products you put your hands on value, performance and dependability. We are so confident in our products that we offer a 2-year warranty on our entire line.

Next time you're looking to expand the capabilities of your computer system ask for the Microtek box. It's a powerful package.

Product Line

- A large selection of memory expansion cards for **APPLE** — **ATARI** — **IBM** — **COMMODORE** Computers.
- The Apple Dumping series of graphics screen dump interface boards, supports most black/white and **color** printers. Some models include data buffer RAM.

- Apple Parallel Interface cards.
- VISI-Expand program allows your Apple II VISICALC worksheet to expand with an additional 64K or 128K of memory.
- Parallel/ Serial cables up to 25 feet in length.



MICROTEK inc.

9514 Chesapeake Drive
San Diego, CA 92123, (714) 278-0633
Outside CA Toll Free (800) 854-1081
TWX. 910-335-1269

**MICROTEK . . . Professionals you can depend on
. . . Products you can believe in!**



BOTTLENECKED?



SMARTBUFFER

Your fast computer is being **Bottlenecked** by slower peripherals — printers, plotters, modems etc. **SMARTBUFFER** accepts and stores data at computer speed and then drives your printers or other peripherals — **Freeing Your Computer!**

From \$325.00

- User expandable from 16K to 256K
- Parallel, Serial or Both
- 2 or 4 ports standard
- Code conversion (ASCII, EBCDIC, BAUDOT, etc.)
- Data Compression



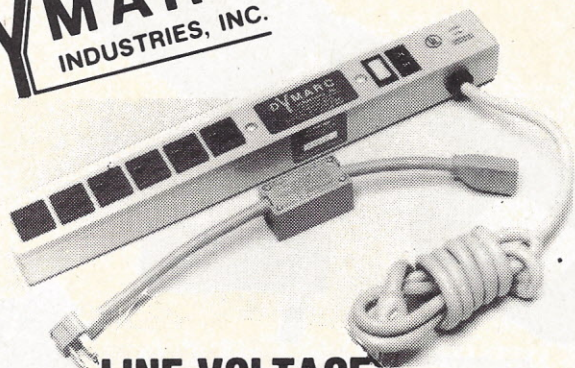
DATA-MATCH CORP.

3810 Oakcliff Ind. Ct. • Atlanta, Ga. 30340 • 404 441-0408

CIRCLE 162



DYMARC INDUSTRIES, INC.



LINE VOLTAGE TRANSIENT SUPPRESSORS

Features Parallel Operation

5000 Hits/Second

Clipstrip™

AND

Clipper™

PROTECTS:

- Computers
- Micro-Computer Systems
- Word Processors
- Cash Registers
- Power Supplies

PROTECTS AGAINST:

- High Energy Voltage Transients
- On-Off Switching
- Lightning Induced Transients
- Inrush of On/Off Power

DYMARC INDUSTRIES, INC.

DEALER INQUIRIES INVITED

7133 Rutherford Rd.
Baltimore, Md. 21207

Clipstrip
977E



LISTED

Clipper
678F



LISTED

WE HONOR



VISA

800-638-9098
(301) 298-3130

SOFTWARE INDEX

Integer BASIC Compiler
offer machine language
speed and flexibility for the
novice and experienced
programmer
for Apple II
\$149.95

Synergistic Software
Renton, WA 98055
mail order
CIRCLE 361

MEMORY JOGGER
shows controls/function keys,
debug commands and link
prompt/responses
for IBM Personal Computer, Atari
400/800 and Apple II
\$10

JC Computer
Specialists
Federal Way, WA
98003
retail
CIRCLE 362

MODEC
translates Morse Code into
characters
for Apple II
\$14.95

Cotec
Saratoga, CA 95070
mail order
CIRCLE 363

PCTEXT
can be used with any text
editor to produce
professionally formatted
documents
for IBM Personal Computer
\$100

Intellect Associates
Holbrook, NY 11741
mail order
CIRCLE 364

Peachtree Graphics Language
interactive graphics
programming language
for CP/M-based systems
\$600

Peachtree Software
Atlanta, GA 30326
see story on page 229
retail
CIRCLE 321

PersonalFORTH
features multi-tasking operating
systems and full screen
cursor driven editor
for IBM Personal Computer
\$300

FORTH Inc.
Hermosa Beach, CA
90254
mail order and retail
CIRCLE 365

PolyFORTH II
allows the user to select the
needed support level
consistent with his requirements
for IBM Personal Computer
from \$300

FORTH Inc.
Hermosa Beach, CA
90254
mail order and retail
CIRCLE 366

Solid State Disk Emulator
features automatic copying of
disk into SSD memory and
increased speed
for Apple II and Apple II Plus
\$550 single disk, \$950 dual disk

Synetix Industries Inc.
Redmond, WA 98052
mail order
CIRCLE 367

SUPERFILE
text filing, cross referencing and
retrieval program
for CP/M- and MP/M-based
systems
\$195

FYI Inc.
Austin, TX 78766
retail
CIRCLE 368

SuperPILOT
designed for interactive
video and graphics applications
for Apple II and Apple II Plus
\$50

Apple Computer Co.
Cupertino, CA 95014
retail
CIRCLE 369

CIRCLE 95



TI-994A Keyboard \$300.00



TEXAS INSTRUMENTS
INCORPORATED

INCORPORATED				INCORPORATED			
Model	Name	Mfr. Sugg. Ret.	Elek-Tek Price	Model	Name	Mfr. Sugg. Ret.	Elek-Tek Price
CONSOLE				APPLICATION PROGRAMS CONTINUED			
PHC 004A	TI-994A Home Computer (incl. RF Modulator)	525.00	300.00	Education/Personal Enrichment Continued			
PERIPHERALS				PHD 5086	Natural Science* (Extended BASIC Command Module is required)	29.95	24.00
PHP 1200	Peripheral Expansion Box	249.95	180.00	PHD 5087	Social Science* (Extended BASIC Command Module is required)	29.95	24.00
PHP 1220	RS-232 Card	174.95	130.00	PHD 5088	Teacher's Tool Box* (Extended BASIC Command Module and printer are required)	29.95	24.00
PHP 1240	Disk Controller Card (One Disk Manager module packed with each Disk Controller)	249.95	180.00	PHD 6007	Teach Yourself BASIC	29.95	24.00
PHP 1250	Expansion System Disk Drive (Disk Drive Controller required)	399.95	285.00	PHD 6009	Music Skills Trainer	24.95	20.00
PHP 1260	Memory Expansion Card (32K RAM)	299.95	215.00	PHD 6011	Computer Music Box	14.95	12.00
PHP 1270	P-Code Card (32K RAM Memory Expansion required)	249.95	180.00	PHD 6018	Market Simulation	14.95	12.00
PHP 1500	Solid State Speech™ Synthesizer	149.95	110.00	PHD 6019	Teach Yourself Extended BASIC (Extended BASIC Command Module is required)	19.95	16.00
PHP 1600	Telephone Coupler (Modem)	224.95	163.00	PHD 6026	Bridge Bidding I	24.95	20.00
PHP 2500	TI 80 Column Impact Printer	750.00	580.00	PHD 6031	Speak & Math™ Program (Solid State Speech™ Synthesizer and Terminal Emulator II are required)	24.95	20.00
PHP 2300	VCR Controller	499.95	500.00	PHD 6039	Bridge Bidding II	24.95	20.00
PHP 2400	P-Code Peripheral	399.95	290.00	PHD 6041	Bridge Bidding III	24.95	20.00
PHA 2100	R.F. Modulator (TV Adapter)	49.95	35.00	PHD 6042	Speller Writer (Terminal Emulator II Command Module and Solid State Speech™ Synthesizer are required)	24.95	20.00
PHA 4100	10" Color Monitor	399.95	320.00	PHD 6067	Beginner's BASIC Tutor	24.95	20.00
OPTIONAL ACCESSORIES				Entertainment			
PHF 1100	Wired Remote Controllers (Pair)	34.95	28.00	Command Modules			
PHA 1850	Thermal Paper (2 Pack)	9.95	8.00	PHM 3009	Football	29.95	24.00
PHA 2000	Dual Cassette Cable	14.95	12.00	PHM 3018	Video Games I	29.95	24.00
PHA 2010	Monitor Cable	19.95	15.00	PHM 3023	Hunt the Wumpus	24.95	20.00
PHA 2020	Audio Adapter (Headphone Jack)	19.95	15.00	PHM 3024	Indoor Soccer	29.95	24.00
PHA 2310	Panasonic VCR Controller Cables	99.95	85.00	PHM 3025	Mind Changers	24.95	20.00
PHA 2320	Sony Video Controller Cables	99.95	85.00	PHM 3030	A-Maze-Ing	24.95	20.00
PHA 2330	Pioneer Video Controller Cables	99.95	85.00	PHM 3032	Tombstone City: 21st Century	39.95	32.00
APPLICATION PROGRAMS				PHM 3033	TI Invaders	39.95	32.00
Home Management/Personal Finance				PHM 3054	Car Wars	39.95	32.00
PHM 3006	Home Financial Decisions	29.95	24.00	PHM 3057	Munch Man	39.95	32.00
PHM 3007	Household Budget Management (Data storage system is required)	39.95	32.00	PHM 30420	Tunnels of Doom (2 Diskette Games Included)	59.95	45.00
PHM 3012	Securities Analysis	54.95	44.00	PHM 30427	Tunnels of Doom (2 Cassette Games Included)	59.95	45.00
PHM 3013	Personal Record Keeping (Data storage system is recommended)	49.95	40.00	PHM 3056	Alphabet	39.95	32.00
PHM 3016	Tax/Investment Record Keeping (Disk system is recommended)	69.95	56.00	PHM 3110	Chisholm Trail	39.95	32.00
PHM 3022	Personal Real Estate (Data storage system is recommended)	69.95	56.00	PHM 3112	Parasit	39.95	32.00
PHM 3044	Personal Report Generator (Data storage system is recommended)	49.95	40.00	Milton Bradley Packages (Developed by Milton Bradley Company)			
PHM 3111	TI Writer (32K Memory Expansion required)	99.95	75.00	PHM 3031	BlasTOff	39.95	32.00
PHM 3113	Microsoft™ Multiplan™ (32K Memory Expansion required)	99.95	75.00	PHM 3033	Blackjack and Poker II	24.95	20.00
PHD 5001	Diskette	69.95	56.00	PHM 3034	Hustle II	24.95	20.00
PHD 5003	Mailing List	19.95	16.00	PHM 3036	ZeroZap™	19.95	16.00
PHD 5021	Personal Financial Aids	19.95	16.00	PHM 3037	Hangman II	19.95	16.00
PHD 5022	Checkbook Manager	19.95	16.00	PHM 3038	Connect Four™	19.95	16.00
PHD 5024	Business Aids Library—Finance Management (Extended BASIC Command Module is required)	39.95	32.00	PHM 3039	Yahzee™	24.95	20.00
PHD 5027	Business Aids Library—Inventory Management (Personal Record Keeping or Statistics Command Module is required)	69.95	56.00	Adventure International Packages (Developed by Scott Adams)			
PHD 5028	Business Aids Library—Lease/Purchase Decisions (Personal Record Keeping or Statistics Command Module is required)	69.95	56.00	PHM 3041D	Adventure (Pirate Adventure Diskette Game Included)	49.95	40.00
PHD 5029	Business Aids Library—Cash Management (Extended BASIC Command Module is required)	39.95	32.00	PHM 3041T	Adventure (Terminal Emulator II Command Module is required)	49.95	40.00
PHD 5038	Business Aids Library—Lease/Purchase Decisions (Cassette)	14.95	12.00	Gabriel Industries Packages (Developed by Gabriel Industries)			
PHD 6003	Personal Financial Aids	59.95	45.00	PHM 3067	Ohlito! (Developed by Gabriel Industries)	39.95	32.00
PHD 6038	Business Aids Library—Lease/Purchase Decisions			TEXAS INSTRUMENTS PACKAGES			
Educational/Personal Enrichment				PHD 5002	TI Writer (with optional speech)	14.95	12.00
Command Modules				PHD 5010	Mystery Melody	14.95	12.00
PHM 3002	Early Learning Fun	29.95	24.00	PHD 5015	Oldies But Goodies—Games I	19.95	16.00
PHM 3003	Beginning Grammar	29.95	24.00	PHD 5017	Oldies But Goodies—Games II	24.95	20.00
PHM 3004	Number Magic	19.95	16.00	PHD 5025	Saturday Night Bingo (Solid State Speech™ Synthesizer is required)	29.95	24.00
PHM 3005	Video Graphs	19.95	16.00	PHD 5037	Draw Poker (Extended BASIC Command Modules is required)	24.95	20.00
PHM 3008	Video Chess	59.95	48.00	PHD 5057	Tombstone City: 21st Century (32K Memory Expansion and Extended BASIC Command Module are required)	19.95	16.00
PHM 3010	Physical Fitness	29.95	24.00	PHD 5058	TI Invaders (32K Memory Expansion and Either Extended BASIC or Editor/Assembler Command Module are required)	19.95	16.00
PHM 3020	Music Maker (Data storage system is recommended)	59.95	48.00	PHD 5060	Basic Man (32K Memory Expansion and Either Extended BASIC or Editor/Assembler Command Module are required)	19.95	16.00
PHM 3021	Weight Control and Nutrition (Data storage system is recommended)	59.95	48.00	Adventure International Adventure Series (Developed by Scott Adams) (PHM 3041D required)			
PHM 3040	TI LOGO (Memory Expansion required)	129.95	75.00	PHM 5046	Adventureland	29.95	24.00
PHM 3064	Touch Typing Tutor* (Available for TI-99/4A only)	39.95	32.00	PHD 5047	Mission Impossible	29.95	24.00
PHM 3109	TI Logo II (32K Memory Expansion is required)	129.95	75.00	PHD 5048	Voodoo Castle	29.95	24.00
PHM 3015	Scott, Foresman Reading and Math Packages (Developed by Scott, Foresman)			PHD 5049	The Count	29.95	24.00
PHM 3015	Early Reading (Solid State Speech™ Synthesizer is required)	54.95	44.00	PHD 5050	Strange Odyssey	29.95	24.00
PHM 3043	Reading Fun (Solid State Speech™ Synthesizer is recommended)	54.95	44.00	PHD 5051	Mystery Fun House	29.95	24.00
PHM 3046	Reading On	54.95	44.00	PHD 5052	Pyramid of Doom	29.95	24.00
PHM 3047	Reading Roundup	54.95	44.00	PHD 5053	Ghost Town	29.95	24.00
PHM 3048	Reading Rally	54.95	44.00	PHD 5054	Savage Island I & II	39.95	32.00
PHM 3082	Reading Flight	54.95	44.00	PHD 5056	Golden Voyage	29.95	24.00
PHM 3027	Addition and Subtraction I (Solid State Speech™ Synthesizer is recommended)	39.95	32.00	TEXAS INSTRUMENTS PACKAGES			
PHM 3028	Addition and Subtraction II (Solid State Speech™ Synthesizer is recommended)	39.95	32.00	PHD 6010	Mystery Melody	9.95	9.00
PHM 3029	Multiplication I (Solid State Speech™ Synthesizer is recommended)	39.95	32.00	PHD 6015	Oldies But Goodies—Games I	14.95	12.00
PHM 3049	Multiplication II (Solid State Speech™ Synthesizer is recommended)	39.95	32.00	PHD 6017	Oldies But Goodies—Games II	19.95	16.00
Scholastic Packages (Developed by Scholastic, Inc.)				PHD 6025	Saturday Night Bingo (Solid State Speech™ Synthesizer is required)	24.95	20.00
PHM 3059	Scholastic Spelling—Level 3 (Solid State Speech™ Synthesizer is required)	59.95	48.00	PHD 6037	Draw Poker	19.95	16.00
PHM 3060	Scholastic Spelling—Level 4 (Solid State Speech™ Synthesizer is required)	59.95	48.00	Adventure International Adventure Series (Developed by Scott Adams) (PHM 3041T required)			
PHM 3061	Scholastic Spelling—Level 5 (Solid State Speech™ Synthesizer is required)	59.95	48.00	PHD 6046	Adventureland	29.95	24.00
PHM 3062	Scholastic Spelling—Level 6 (Solid State Speech™ Synthesizer is required)	59.95	48.00	PHD 6047	Mission Impossible	29.95	24.00
Addison-Wesley Computer Math Games (Developed by Addison-Wesley Publishing Co.)				PHD 6048	Voodoo Castle	29.95	24.00
PHM 3083	Computer Math Games I	39.95	32.00	PHD 6049	The Count	29.95	24.00
PHM 3088	Computer Math Games VI	39.95	32.00	PHD 6050	Strange Odyssey	29.95	24.00
Milliken Home Math Series—K thru 8th grade (Developed by Milliken Publishing Co.)				PHD 6051	Mystery Fun House	29.95	24.00
PHM 3090	Addition	39.95	32.00	PHD 6052	Pyramid of Doom	29.95	24.00
PHM 3091	Subtraction	39.95	32.00	PHD 6053	Ghost Town	29.95	24.00
PHM 3092	Multiplication	39.95	32.00	PHD 6054	Savage Island I & II	39.95	32.00
PHM 3093	Division	39.95	32.00	PHD 6056	Golden Voyage	29.95	24.00
PHM 3094	Integers*	39.95	32.00	OTHER APPLICATION PROGRAMS			
PHM 3095	Fractions*	39.95	32.00	Command Modules			
PHM 3096	Decimals*	39.95	32.00	PHM 3001	Demonstration	69.95	58.00
PHM 3097	Percents*	39.95	32.00	PHM 3011	Speech Editor (Solid State Speech™ Synthesizer is required)	44.95	36.00
TEXAS INSTRUMENTS PACKAGES				PHM 3014	Statistics (Data storage system is recommended)	44.95	36.00
PHD 5007	Teach Yourself BASIC	34.95	28.00	PHM 3026	Extended BASIC	99.95	75.00
PHD 5009	Music Skills Trainer	29.95	24.00	PHM 3035	Terminal Emulator II	49.95	40.00
PHD 5011	Computer Music Box	19.95	16.00	PHM 3055	Editor/Assembler	99.95	80.00
PHD 5018	Market Simulation	19.95	16.00	PHM 3058	Mini-Memory (4K)	99.95	80.00
PHD 5019	Teach Yourself Extended BASIC (Extended BASIC Command Module is required)	24.95	20.00	PHM 3045D	SMU Electrical Engineering Library* (2 Diskettes included)	149.95	120.00
PHD 5020	Music Maker Demonstration (Music Maker Command Module is required)	14.95	12.00	PHM 3045T	SMU Electrical Engineering Library* (10 Cassettes included)	149.95	120.00
PHD 5023	Basketball Statistics (Extended BASIC Command Module is required)	24.95	20.00	PHD 5004	Programming Aids I	14.95	12.00
PHD 5026	Bridge Bidding I	29.95	24.00	PHD 5005	Programming Aids II	24.95	20.00
PHD 5030	Speak & Spell™ Program (Solid State Speech™ Synthesizer is required)	29.95	24.00	PHD 5006	Math Routine Library	29.95	24.00
PHD 5031	Speak & Math™ Program (Solid State Speech™ Synthesizer and Terminal Emulator II are required)	29.95	24.00	PHD 5008	Electrical Engineering Library	29.95	24.00
PHD 5039	Bridge Bidding II	29.95	24.00	PHD 5012	Programming Aids III	19.95	16.00
PHD 5041	Bridge Bidding III	29.95	24.00	PHD 5013	Graphing Package	19.95	16.00
PHD 5042	Speller Writer (Terminal Emulator II Command Module and Solid State Speech™ Synthesizer are required)	29.95	24.00	PHD 5016	Structural Engineering Library	29.95	24.00
PHD 5067	Beginner's BASIC Tutor	29.95	24.00	PHD 5044	AC Circuit Analysis	29.95	24.00
MECC Packages (Developed by Minnesota Educational Computing Consortium)				PHD 5063	UCSD-PASCAL-II Compiler (32K Memory Expansion and P-Code required)	124.95	100.00
PHD 5078	Metric and Counting* (Extended BASIC Command Module is required)	29.95	24.00	PHD 5064	UCSD P-System Editor/Linker (32K Memory Expansion and P-Code required)	99.95	80.00
PHD 5079	Elementary Economics*	29.95	24.00	PHD 5065	UCSD P-System Editor/Utilities (32K Memory Expansion and P-Code required)	74.95	60.00
PHD 5080	Elementary Math and Science* (Extended BASIC Command Module is required)	29.95	24.00	PHD 5066	TI PILOT (32K Memory Expansion and P-Code required)	79.95	60.00
PHD 5081	Astronomy* (Extended BASIC Command Module is required)	29.95	24.00	PHD 5068	Course Designer Authoring Package (Extended BASIC required and Video Controller optional)	199.95	150.00
PHD 5082	Word Beginnings* (Extended BASIC Command Module is required)	29.95	24.00	PHD 5075	Text-to-Speech (English) (Solid State Speech™ Synthesizer, 32K Memory Expansion and Extended BASIC Command Module are required)	29.95	24.00
PHD 5083	Exploring* (Extended BASIC Command Module is required)	29.95	24.00	PHD 6004	Programming Aids I	9.95	9.00
PHD 5084	Math Practice* (Extended BASIC Command Module is required)	29.95	24.00	PHD 6006	Math Routine Library	24.95	20.00
PHD 5085	Science Facts* (Extended BASIC Command Module is required)	29.95	24.00	PHD 6008	Electrical Engineering Library	24.95	20.00
SOFTWARE LIBRARIES				PHD 6013	Structural Engineering Library	14.95	12.00
PHL 7001	The Home Financial Manager	139.95	100.00	PHD 6016	AC Circuit Analysis	24.95	20.00
PHL 7002	The Family Entertainer	89.95	65.00	PHL 7001	The Home Financial Manager	139.95	100.00
PHL 7003	The Elementary Educator	99.95	75.00	PHL 7002	The Family Entertainer	89.95	65.00
PHL 7004	The Music Educator	64.95	50.00	PHL 7003	The Elementary Educator	99.95	75.00
PHL 7005	The Super Programmer	119.00	90.00	PHL 7004	The Music Educator	64.95	50.00
PHL 7006	The Speaking Math Teacher	119.85	90.00	PHL 7005	The Super Programmer	119.00	90.00
PHL 7007	The Speaking Reading Teacher	109.80	80.00	PHL 7006	The Speaking Math Teacher	119.85	90.00
PHL 7008	The Speaking Scholastic Spelling Teacher	219.80	160.00	PHL 7007	The Speaking Reading Teacher	109.80	80.00
PHL 7009	The TI Arcade Game Series	119.85	90.00	PHL 7008	The Speaking Scholastic Spelling Teacher	219.80	160.00
PHL 7010	The Milton Bradley Game Series	114.75	90.00	PHL 7009	The TI Arcade Game Series	119.85	90.00
PHL							

* Available in Fourth Quarter 1982.
† Developed by Scott, Foresman.
‡ Developed by Milton Bradley—The Attack, Blast, Hustle, ZeroZap, Connect Four and Yahzee are trademarks of Milton Bradley.
††† Developed by Microsoft™, Inc. Multiplan™ is a trademark of Microsoft™, Inc.

ELEK-TEK, inc.
6557 N. Lincoln Ave., Chicago, IL 60645
(800) 621-1269 (312) 677-7660

New update from Tarbell...

CP/M DATABASE for only \$100!

IMPROVED FEATURES

☐ 3 times faster than previous version ☐ CB80 language source and COM files included ☐ improved query language ☐ up to 19 files open at once ☐ command file processor ☐ no limit on record length or number of records

OTHER ADVANTAGES

☐ variable-length fields ☐ field names of any length ☐ field names may include spaces ☐ sequential or random files ☐ optional index files ☐ also runs under CBASIC

INTERACTIVE PROGRAMS

Tarbell Database also includes these interactive programs: DBSORT, sorts random files; DBSETUP, creates a file; DBENTRY for entering data; DBUPDATE for changing files; DBQUERY for accessing data; DBLABEL for printing labels; DBLETTER for printing letters; DBCOPY to change structure of a file.

TARBELL VALUE

Dollar for dollar, you can't get a better value than Tarbell's updated Database System. Ask your nearest Tarbell dealer for a demo.



950 Dovlen Place, Suite B
Carson, CA 90746
(213) 538-4251

CP/M, CB80 and CBASIC are trademarks of Digital Research.

CIRCLE 165

SOFTWARE INDEX

Ultimenu
can invoke any of 36 programs
or batch files with a single
keystroke
for IBM Personal Computer
\$24.95

DB/DC Software
Assoc.
Manchester, NH
03108
retail
CIRCLE 371

Window
a full screen text editor program
for IBM Personal Computer
\$150

Intellect Associates
Holbrook, NY 11741
mail order
CIRCLE 372

ZIP
a user-friendly screen handler
and report generator
for Osborne 1
\$160

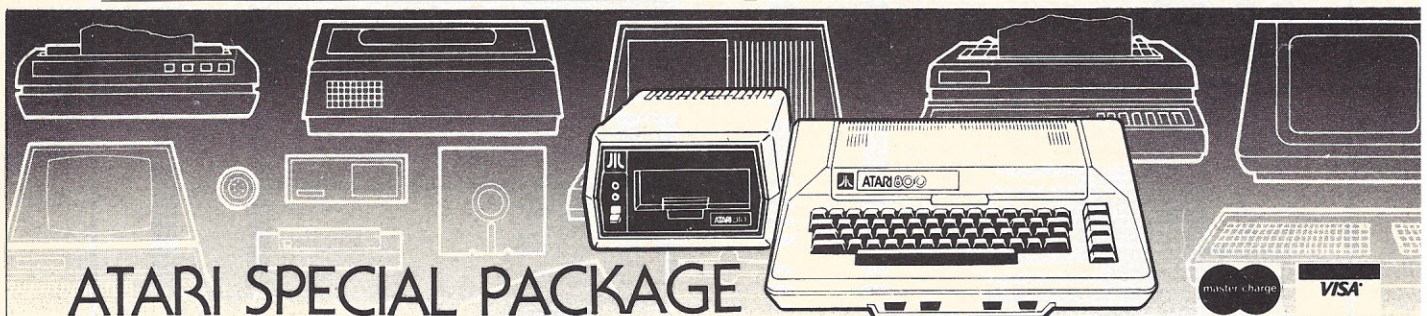
Nexus
Los Angeles, CA
90036
mail order
CIRCLE 373

COMMUNICATIONS

Appletel Disk
allows Apple computer users
to plug into the Prestel World
Videotex Service
for Apple II
\$85

Logica
New York, NY 10017
mail order
CIRCLE 374

(continued on page 258)



ATARI SPECIAL PACKAGE 800 COMPUTER WITH DISK DRIVE \$ 1,119.00

ATARI SOFTWARE

Invit. to program. 2	24.95
Invit. to program. 3	24.95
Microsoft Basic	74.95
Pilot	64.95
Atari Persl.Finance	59.95
Missile Command	34.95
Asteroids	34.95
Caverns of Mars	31.95
LJK Letter Perfect	119.95
LJK Mailmerge/Utility	24.95
LJK Data Perfect	79.95
Synapse Filemgr. 800	79.95
Datsoft Text Wizard	79.95
Ghost Hunter	26.95
16K RAM	69.95
32K RAM	139.95

APPLE SOFTWARE

Micro Pro Wordstar	239.00
Micro Pro Calcstar	149.00
Magic Window	79.95
D.B. Master	169.00
Visicalc 3.3	189.95
Visiplot	169.95
Visidex	169.95
PFS Filing/Database	79.95
PFS Report	79.95
Pro Easywriter	195.00
Pro Easywriter	79.95
Raster Blaster	25.95
Snack Attack	25.95
Auto Atlas	26.95

COMPUTERS

Altos 8000-2	2895.00
Northstar Advantage	3299.00
NEC PC 8001A	795.00

PRINTERS

Epson MX-80	459.00
Okidata 82A	449.00
NEC 8023A	479.00
Diablo 630	2195.00
NEC 3510	1795.00

MODEMS

Hayes Microm. II	269.00
Hayes Smartm.	229.00
Novation DCAT	159.00

MONITORS

NEC 12" Green	159.00
NEC 13" Color	329.00
Amdek 12" green	119.00

MEDIA

Verbatim	25.00/box
Dysan	37.00/box

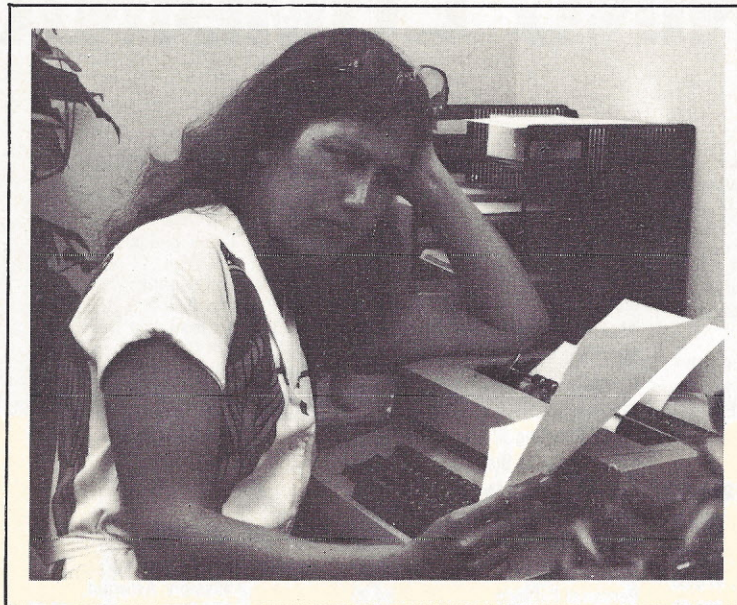


THE PURCHASING SERVICE FOR HOME & BUSINESS COMPUTERS

18639 1/2 VENTURA BLVD., TAPZANA CA. 91356, (213) 996-5722

FREE CATALOG... offering the most complete line of computer products in the country. Your satisfaction is backed by our 30 day guarantee. ALL PRODUCTS DISCOUNTED UP TO 30%. COMPARE PRICES & KNOWLEDGE. No minimum orders. Please add 3% for shipping, handling & insurance. Showroom by appt. only Monday to Friday 9:30-5:30. (PRICES SUBJECT TO CHANGE).

OFFICE SLOW DOWNS?



MicroAge[®] HAS THE SOLUTION!

Paper Work Got You Down?

Eliminate the dreaded office slow downs with a word processing computer solution from MicroAge.

A word processing system gives you fingertip control. Lets you create, view, edit, revise, print and store information. Save and append documents by simple keyboard commands. No more frustration, wasted time, continual typing and retyping. No more whiteouts.

MicroAge knows office management problems. We are experts at installing word processing computers in business environments and selecting systems that can do additional time saving office tasks.

Computerized business systems from the MicroAge Computer Store are available in the \$5,000 to \$15,000 range. MicroAge backs up every system with personalized service, warranty service and repair, installation, . . . even customer training.

Visit the MicroAge Computer Store in your area and let us help with your business solutions.

MicroAge[®]
COMPUTER STORE
"The Solution Store"

VISIT THE STORE IN YOUR AREA:

Anchorage, Alaska
(907) 279-6688

Phoenix, Arizona
(602) 265-0065

Pleasant Hill, California
(415) 680-1489

Santa Ana, California
(714) 558-7789

Norwalk, Connecticut
(203) 846-0851

Danbury, Connecticut
(203) 797-1623

Greenwich, Connecticut
(203) 629-8171

W. Palm Beach, Florida
(305) 683-5779

Orland Park, Illinois
(312) 349-8080

Indianapolis, Indiana
(317) 849-5161

Salina, Kansas
(913) 823-7596

Lexington, Kentucky
(606) 278-0304

Minneapolis, Minnesota
(612) 338-1777

St. Louis, Missouri
(314) 567-7644

Omaha, Nebraska
(402) 339-7441

Albuquerque, New Mexico
(505) 883-0955

Rochester, New York
(716) 244-9000

Columbus, Ohio
(614) 868-1550

Columbus, Ohio
(614) 451-8080

Oklahoma City, Oklahoma
(405) 728-1837

Tulsa, Oklahoma
(918) 250-9502

Allentown, Pennsylvania
(215) 434-4301

Nashville, Tennessee
(615) 327-9669

El Paso, Texas
(915) 591-3349

Houston, Texas
(713) 440-7547

Houston, Texas
(713) 270-9647

Hurst, Texas
(817) 284-3413

Milwaukee, Wisconsin
(414) 257-1100

Toronto, Canada
(416) 487-5551

FOR FRANCHISE INFORMATION CALL (602) 968-3168

CIRCLE 171

ATARI® + asap® = A WINNING COMBINATION !

What ever your needs, Computers, Software, or accessories, ASAP services your needs. Whether your ATARI® is for work or play, ASAP has what you want.

The ATARI® 800™ Computer features color graphics and english characters with truly high resolution, high quality sound, expandable memory and sleek modular appearance.

ASAP offers a complete line to expand your ATARI®'s performance. We have the technology and experience that you can trust. **DEPEND ON ASAP.**

Atari® 400™ — 16K also available: \$299.00

OPTIONAL ACCESSORIES	PRICE
ATARI® 410™ Program Recorder.....	80.00
ATARI® 810™ Disk Drive.....	470.00
ATARI® 822™ Thermal Printer.....	299.00
ATARI® 825™ 80-column Dot	
Matrix Impact Printer.....	645.00
ATARI® 830™ Acoustic Modem.....	159.00
ATARI® 850™ Interface Module.....	175.00
ATARI® Paddle (CX30-04) and	
Joystick (CX40-04) (Pair).....	17.95
ASAP 16K RAM Module.....	45.00

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE. CALL FOR BEST PRICE.

Ordering information: name, address, phone; ship by: UPS or Mail. Shipping charge: add \$2.90 up to 1 lb. (UPS blue), U.S. Mail add \$1.50 (U.S. only) (\$25.00 minimum order).

Terms: We accept cash, check, money orders, Visa and Master Charge (U.S. funds only). Tax: 6% Calif. res., 6 1/2% L.A. County, COD's and terms available on approval (School PO's Accepted).

asap
computer
products, inc.

1198 E. Willow St., Signal Hill, CA 90806
Call Toll Free (800) 421-7701
In California (213) 595-6431
or (714) 891-2663
In Canada Call ASAP Computer
Products LTD., 116 Viceroy Rd., D-12 Concord
Toronto, Ontario, Canada L4K 1A9
(416) 738-0500 (800) 268-1996

COMPLETE SOFTWARE LIBRARY INCLUDES THESE POPULAR UNITS:

Atari®	
Video Easel ROM.....	26.00
Music Composer ROM.....	44.00
Assembler/Editor ROM.....	45.00
Mortgage Loan Analysis	
Cassette.....	15.95
Stock Analysis Disk.....	19.95
Stock Charting.....	22.95
Bond Analysis Disk.....	22.95
Mailing List Cassette.....	19.95
Touch Typing (2 Cass).....	19.95
Graph It (2 Cass).....	17.95
Word Processor.....	119.00
Personal Finance.....	64.95
Microsoft Basic.....	75.00
Basketball ROM.....	27.00
Super Breakout ROM.....	33.00
Computer Chess ROM.....	32.00
3D Tic Tac Toe ROM.....	26.00
Star Raiders ROM.....	37.00
Kingdom Cassette.....	12.95
Blackjack Cassette.....	12.95
Biorhythm Cassette.....	12.95
Energy Czar Cassette.....	12.95
Telelink ROM.....	24.00
Space Invaders ROM.....	33.00
Scram.....	18.95
Asteroids.....	32.00
Missile Command.....	32.00
Caverns of Mars Disk.....	32.00
Centipede Disk.....	35.00
Pac-Man.....	35.00

Arcade Plus

Ghost Hunter Cassette.....	23.50
Ghost Hunter Disk.....	27.50

VISICORP

583-012 Visicaic, 32K Disk....	210.00
--------------------------------	--------

ARCADE PLUS

123-001 Ghost Hunter,	
16K Disk.....	25.00
123-002 Arcade Pro-Football,	
24K Disk.....	29.95
123-301 Ghost Hunter,	
16K Cass.....	22.00
123-302 Arcade Pro-Football,	
24K Cass.....	26.95

ADVENTURE INTERNATIONAL

063-060 Starflight (Star Trek 3.5)	
40K Disk.....	21.50
063-061 Lunar Lander,	
32K Disk.....	19.95
063-084 Rear Guard,	
24K Disk.....	19.95
063-360 Starflight (Star Trek 3.5)	
32K Cass.....	17.95
063-361 Lunar Lander,	
24K Cass.....	12.95
063-384 Rear Guard,	
16K Cass.....	17.95

ON-LINE SYSTEMS

543-000 HI-RES Adv #0-	
Mission: Asteroid,	
40K Disk.....	19.95
543-002 HI-RES Adv #2-	
Wizard & Princess,	
40K Disk.....	25.00
543-023 Jawbreaker,	
16K Disk.....	25.00
543-025 Softporn Adventure,	
40K Disk.....	25.00
543-048 Frogger (avail. June),	
Disk.....	29.95
543-313 Crossfire,	
16K Cass.....	25.00
543-323 Jawbreaker,	
16K Cass.....	25.00
543-348 Frogger (avail. June),	
Cass.....	25.00

K-BYTE

653-001 K-DOS, 32K Disk ..	79.95
653-101 K-Razy Shootout,	
8K cart.....	39.95
653-402 K-Razy Kritters,	
8K Cart.....	39.95
653-403 K-Star Patrol,	
8K Cart.....	39.95
653-404 K-Razy Antiks,	
8K Cart.....	39.95

DATASOFT

323-901 Le Stick, Accs....	32.00
----------------------------	-------

GEBELLI

403-004 Andromeda, 24K Disk	
(New Improved)....	29.95
403-005 Pathfinder, Disk....	29.95

ROKLAN CORP

RC3-001 Deluxe Invaders,	
16K Disk.....	29.95
RC3-002 Gorf, 16K Disk.....	34.95
RC3-003 Wizard of Wor,	
16K Disk.....	34.95
RC3-004 Telecom, Disk.....	59.95
RC3-401 Deluxe Invaders,	
Cart.....	34.95
RC3-402 Gorf, Cart.....	39.95
RC3-403 Wizard of Wor,	
Cart.....	39.95

AUTOMATED SIMULATIONS

143-001 Temple of Apsai,	
32K Disk.....	34.95
143-004 Rescue at Rigel,	
32K Disk.....	25.00
143-007 Crush, Crumble & Chomp	
32K Disk.....	25.00
143-301 Temple of Apsai,	
32K Cass.....	34.95
141-704 Rescue at Rigel,	
32K Cass.....	25.00
141-707 Crush, Crumble & Chomp	
32K Cass.....	25.00

AVALON HILL GAME COMPANY

183-009 Empire of the Overmind,	
40K Disk.....	29.95
183-011 Tanktics,	
32K Disk.....	25.00
180-701 B-1 Nuclear Bomber,	
16K Cass.....	13.95
180-702 Midway Campaign,	
32K Cass.....	13.95
180-703 North Atlantic Convoy	
Raider, 16K Cass....	13.95
180-708 Lords of Karma,	
40K Cass.....	16.95
180-709 Empire of the Overmind,	
40K Cass.....	25.00
180-711 Tanktics,	
24K Cass.....	19.95

BRODERBUND SOFTWARE

263-017 Apple Panic,	
48K Disk.....	25.00

BUDGEBO

283-001 Raster Blaster,	
32K Disk.....	25.00

CAVALIER

293-003 Bug Attack,	
16K Disk.....	25.00
293-303 Bug Attack,	
16K Cass.....	25.00

\$2495 PUTS YOU IN BUSINESS.

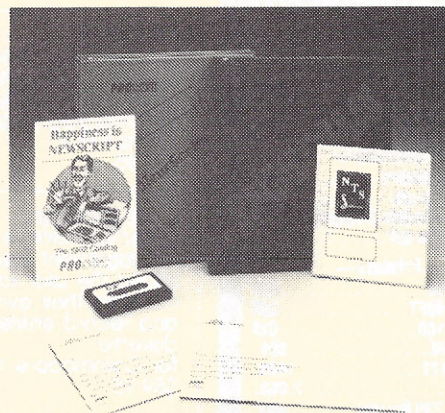


Introducing the MTI® BUSINESS Computer. We believe in offering you the best in complete, low cost computing.

MTI MOD III PLUS B/140. A personal BUSINESS Computer that has been designed and priced for your business, your department...yourself. MTI BUSINESS Computers offer you many "upgrade" features as standard. All MTI BUSINESS Computers include a 65-key keyboard complete with a 12-key datapad, a large 12" monitor and anti-glare screen, RS-232 printer interface, cooling unit and more. The memory is 48K and has a Z80 processor and two double density disk drives. Perfect for BUSINESS use.

LOW PRICE. M.T.I. BUSINESS computers are priced from \$2495. As an added incentive, we will give you a business software package **FREE** with the purchase of a MOD III PLUS BUSINESS computer. The software package has a retail value of \$1588.00.

All of this for \$2495.



FREE SOFTWARE ACCOUNTING PACKAGE

- ACCOUNTS RECEIVABLE
- ACCOUNTS PAYABLE
- GENERAL LEDGER
- INVENTORY/SALES ANALYSIS
- PAYROLL
- INCLUDES AUDIO SELF-LEARNING CASSETTE
- GAMES
- EDUCATION SOFTWARE
- DOS PLUS 3.3

WORD PROCESSING

We are also offering a discount certificate entitling the purchaser to NEW SCRIPT by Pro Soft. With NEW SCRIPT you have complete word processing software.

- 90 Day Warranty
- One Year Extended Warranty Available
- Local Dealer Service
- TRS-80 Compatible

- **EASY TO USE**
- **READY TO OPERATE**
- **INCLUDES AUDIO SELF-LEARNING CASSETTE**

OPTIONS:

- LETTER QUALITY PRINTER
- WINCHESTER CP/M 2.2

**OVER 100 AUTHORIZED DEALERS
CALL 714-979-9923
for the dealer nearest you**

U.S. PRICES F.O.B. SANTA ANA
CALIFORNIA AND MAY VARY BY AREA.

CP/M is a registered trademark of Digital Research, Inc.
TRS-80® is a registered trademark of Tandy Corp.
M.T.I. is a registered trademark of Microcomputer Technology, Inc.

WANT MORE?

For more information and a free catalog, write:
MICROCOMPUTER TECHNOLOGY INC.
3304 W. MACARTHUR, SANTA ANA, CA 92704

Name _____
Company _____
Address _____
City _____ State _____ Zip _____



MICROCOMPUTER TECHNOLOGY INC.
3304 W. MACARTHUR, SANTA ANA, CA 92704
(714) 979-9923 • TWX 910-595-1902 MTISNA

Lowest Prices on Personal Computers!

Apple II + 48K Call
Apple III 128K Call

—CCS/Appie—

Centronics Printer Interface . . . \$95.
Serial Interface . . . 125.

—MicroSoft/Appie—

16K RAM Card . . . 145.
Z-80 Soft Card . . . 275.
CP/M® Premium System . . . 599.

—Mountain/Appie—

CPS Multifunction Card . . . 195.
Clock . . . 239.
ROM Plus . . . 130.
AD/DA Card . . . 295.
Music System . . . 355.

—Videx/Appie—

80 Column Card . . . 270.
Enhancer II . . . 115.

—Vista/Appie—

PROM Development System . . . 420.
Clock (Apple II) . . . 165.
DD 8" Disk Controller . . . 525.
V 1100 8" Dual Disk Drive . . . 2250.
VisiCalc(ATARI 800, IBM, Apple) . . . 185.
Special prices on other VisiCorp®
Software— Call Us For Best Prices

—Commodore—

Vic-20 . . . \$239.
Datassette . . . 67.
Vic-1540 Disk Drive . . . 519.
80 Column Graphics Printer . . . 340.
Vic Avenger . . . 24.95

—NEC—

PC-8001 32K Computer . . . 725.
PC-8031 Dual Disk Drive . . . 725.
PC-8023 Printer . . . 499.
General Ledger Software . . . 315.
Word Processing Software . . . 395.

—Texas Instruments—

TI-99/4 Home Computer . . . 298.
TI-1850 Disk Drive . . . 390.
TI-55 II Calculator . . . 36.
TI LCD Program Calculator . . . 55.
TI-58 C Calculator . . . 79.
TI-59 C Calculator . . . 169.
TI-PC100 Printer/Plotter . . . 149.

—Sharp—

PC-1500 Hand Held Computer . . . 219.
CE-150 Four Color Printer . . . 185.
IBM- Quadboards by Quadram, Corp.
Memory Expansion/ Clock/ Parallel
Interface, RS232 Inter. On One Board!
Quad Board w/64K Installed . . . 495
Quad Board w/256K Installed . . . 795



**HEWLETT
PACKARD**

HP-41CV . . . \$237

HP-41C . . . \$189

HP-41 CARD READER . . . \$165

HP-41 OPTICAL WAND . . . 99

HP-IL PRINTER (82143A) . . . 289

HP-IL INTERFACE MODULE . . . 95

HP-IL PRINTER (82162A) . . . 375

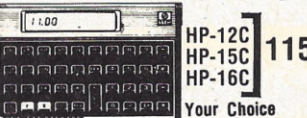
HP-IL DIGITAL CASS. DRIVE . . . 419

HP-IL VIDEO INTERFACE . . . CALL

HP-41 EXT. FUNC. MEM. MOD. . . 62

HP-41 EXT. MEMORY MOD. . . 62

HP-41 TIME MODULE . . . 62



Your Choice

HP-11C, \$75.

ATARI 800, \$649
ATARI 400, \$259



ATARI 16K Memory Mod. . . \$75.

ATARI 850 Interface Mod. . . 159.

ATARI 830 Modem . . . 145.

ATARI 825, 80 Column Printer . . . 565.

ATARI 410 Program Recorder . . . 79.

ATARI 810 Disk Drive . . . 439.

ATARI Joysticks, Pair . . . 17.

ATARI PAC-MAN® . . . 32.

Call us for the best prices
on the full ATARI line.

—Monitors—

Amdek Color I 13" . . . \$349.
Amdek 300G 13" Green Phos. . . 190.
Amdek Color II . . . 760.
BMC 12" Green Phos. . . 160.
Zenith 121 12" Green Phos. . . 119.

—Modems—

Hayes Smartmodem . . . 239.
Hayes Cronograph . . . 210.
Hayes Micromodem II (Apple II) . . . 310.
Novation Apple Cat. . . 319.

—Printers—

Epson MX-80 . . . Call
Epson MX-80FT . . . Call
Epson MX-100 . . . Call
IDS Prism 80 . . . 899.
IDS Prism 132 . . . 1499.
Diablo 630 . . . 2,050.
Centronics 739 Parallel . . . 499.
NEC 8023 . . . 499.
Okidata 82A . . . 475.
Smith-Corona TP-1 . . . 649.
C. Itoh Prowriter 8510A Parallel . . . 499.
C. Itoh Prowriter 8510A Par. & Ser. . . 615.

Prices do not include shipping. All prices and offers subject to change without notice.

**Personal
PC Systems**
Box 1073
Syracuse, N.Y. 13201

315-478-6800

CIRCLE 176

SOFTWARE INDEX

(continued from page 254)

COMCOM
communicates with essentially
any time-sharing system, data
base, bulletin board or other
computer as if your computer
were a terminal
for Osborne 1
\$95

COMPU-DRAW
Rochester, NY 14620
mail order
CIRCLE 375

Mail Monitor
allows users on local area
networks to send letters
or data to each other
for Apple II and Corvus Concept
\$200

Software Connections
Santa Clara, CA
95054
retail
CIRCLE 376

OZMOSIS
designed to transfer both
text and binary files to or from
the Osborne 1 and another
CP/M-based computer
for Osborne
\$150

Acquis Data Inc.
Irvine, CA 92714
retail
CIRCLE 377

LEISURE/HOME

Call To Arms
a battle of wits and
strategy for 2 to 4 players
featuring maps of Europe in
1942 or Scotland in 1750
for IBM Personal Computer
\$29.95

Sirius Software Inc.
Sacramento, CA
95827
retail
CIRCLE 378

CYCLOD
video representation of a
game wherein an eyeball fights
snakes with bricks
for Atari 800, Apple II and
Apple II Plus
\$29.95

Sirius Software
Sacramento, CA
95827
retail
CIRCLE 379

Data Manager
a comprehensive data
management system that
allows the user to define and
manage their own data base
and record entries on
diskette
for Commodore VIC-20
\$59.95

MicroSpec Ltd.
Plano, TX 75075
retail and mail order
CIRCLE 380

K-Star Patrol
star ships confront alien
attack ships and an
intergalactic leech
for Atari 400/800
\$49.95

OPTICOM
International Ltd.
West Bloomfield, MI
48033
retail
CIRCLE 381

Leaguebow!-24
provisions are included for
forfeits, snapout errors,
team ties, individual ties,
substitute bowlers and lane
assignments anywhere in a
98-lane house
for TRS-80 Model III
from \$145

Briley Software
Livermore, CA 94550
retail and mail order
CIRCLE 382

NOW, YOUR APPLE™ CAN GENERATE PROGRAM CODE IN MINUTES...



NO PROGRAMMING KNOWLEDGE NECESSARY!

It magic? No, not magic, but an amazing software package that generates basic code for programs using your APPLE™ computer.* **THE CREATOR™** by Software Technology for Computers will generate Applesoft BASIC programs in final form in a matter of minutes. No programming knowledge is necessary.

THE CREATOR™ is easy for a beginner or expert to use. Even a novice can produce professional programs. The programs you generate will be accomplished quickly, easily and error-free the first time and every time. Under most conditions, the programs generated will be almost complete, leaving only a few statements at most to input yourself.

THIS PROGRAM IS FOR YOU. If you have put off writing your own program because you "can't understand BASIC," or "don't have the time," then **THE CREATOR™** is for you. Use **THE CREATOR™** to save time in generating your own programs or as a method to merge new ideas into your existing programs.

the functions you need are contained within THE CREATOR™ It generates input and output routines, file structures, sort and search routines, dollar formats, totals and more by just answering simple English questions. Sound amazing? Well, it certainly is!

THE CREATOR™ comes with extensive documentation and a detailed tutorial to provide you with an unparalleled level of trouble-free, user-oriented performance. **THE CREATOR™** is available for only \$150 (U.S.). If you buy any program this year, this one is a must.

For a personal demonstration of **THE CREATOR™**, contact your local dealer. If your local dealer does not carry **THE CREATOR™**, ask him to give us a call.

IBM PC version is under development.
APPLE is a trademark of APPLE computer company.



Software Technology for Computers
PO Box 428
Belmont MA 02178
(617) 923-4334

CREATOR™ is a trademark of SOFTWARE TECHNOLOGY for COMPUTERS.

The Total Concept In Laboratory Automation Software

easylab™ by M.I.A.
for the Apple II™

- Data Acquisition and Control
- Graphics
- Data Storage and Retrieval
- Data Communication

EASYPAB software is ideally suited for industrial and scientific applications.

Powerful, elegant, easy-to-learn, easy-to-use commands

Simultaneous data acquisition and analysis (interrupt driven)

Develop applications in minutes, not days

EASYPAB systems start at \$995

Call M.I.A. (201) 439-3665 or write:

SYNAPSE VIDEO

123 EAST 89th STREET, NEW YORK, N.Y. 10028

Apple II is a registered trademark of Apple Computer Inc.

**computer
case
company**



• AP103

**comp
case**
NOW TOLL FREE
800-848-7548

• AP101	Apple II with Single Disk Drive	\$109
• AP102	Apple II with Double Disk Drives	119
• AP103	Apple II, 9 inch Monitor & Double Drives ..	129
• AP104	Apple III, two additional Drives & Silentye	139
• AP105	12 inch monitor plus accessories	99
• RS201	TRS-80 Model I, Expansion Unit & Drives ..	109
• RS202	TRS-80 Monitor or TV set	84
• RS204	TRS-80 Model III	129
• RS205	Radio Shack Color Computer	89
• AT301	Atari Computer & Accessories	109
• P401	Paper Tiger 440/445/460	99
• P402	Centronics 730/737 Line Printer II/IV	89
• P403	Epson MX70 or MX80	89
• P404	Epson MX100	99
• P405	IDS 560 or Prism Printer	109
• IB501	IBM Personal Computer	129
• IB502	IBM Monitor	99
• CC80	Matching Attaché Case (5")	85
• CC90	Matching Attaché Case (3")	75
• CC91	Matching Accessory Case	95

computer case company

5650 INDIAN MOUND CT. COLUMBUS, OHIO 43213 (614) 868-9464



CIRCLE 119

SOFTWARE INDEX

Lovers or Strangers
a compatibility evaluator that
tells two people how likely they
are to have a successful
relationship
for Apple II Plus
\$29.95

Alpine Software
Colorado Springs, CO
80909
retail
CIRCLE 383

Personal Money Manager (PMM)
a full-featured interactive
budget manager
for Apple II and Apple III
\$59.95

Educational
Computing Systems
Oak Ridge, TN 37830
mail order
CIRCLE 384

PREPPIE
challenges 1 or 2 players
to maneuver his or her
preppie past various obstacles,
including speeding golf carts
and runaway lawn mowers, and
recover and return golf balls to
the starting position
for Atari 400/800
\$29.95

Adventure
International
Longwood, FL 32750
mail order
CIRCLE 385

Probe One
a science fiction adventure
game
for Atari 400/800
\$34.95

Synergistic Software
Renton, WA 98055
CIRCLE 386

QSORT
an assembly language coupon
management program designed
to save time, money and effort
in maintaining and using store
coupons
for TRS-80 Models I and III and
CP/M-based systems
\$39.95

BV Engineering
Riverside, CA 92519
mail order
CIRCLE 387

Snake Byte
a strategy game featuring user-
defined keys for control of
the snake and pause clause
escape feature for temporary
interruptions of the game
for Atari 800, Apple II and
Apple II Plus
\$29.95

Sirius Software Inc.
Sacramento, CA
95827
retail
CIRCLE 388

Sneakers
features eight separate attacks
and five levels of difficulty
for Apple II and Apple II Plus
\$29.95

Sirius Software
Sacramento, CA
95827
retail
CIRCLE 389

Trader Jack
you are the captain of your
own trading vessel sailing the
Polynesian Islands of the South
Pacific, fighting storms, trading
cargo and hopefully turning a
profit
for Timex-Sinclair Home
Computer
\$14.95

Savage Software
New Smyrna Beach,
FL 32069
mail order
CIRCLE 390

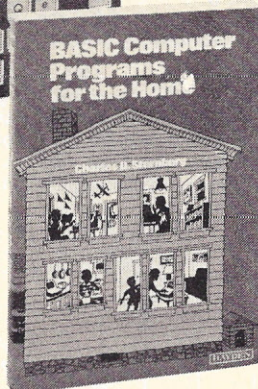
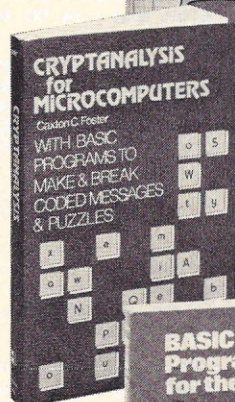
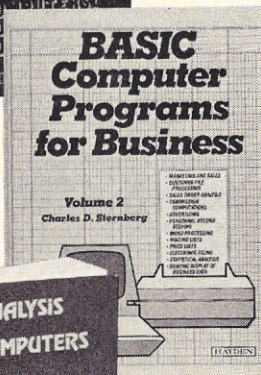
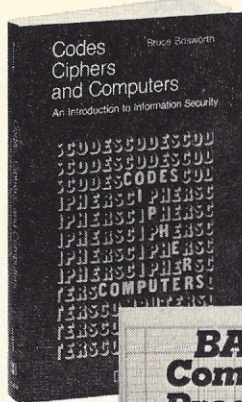


New releases from Hayden

NEW! #6251 Create Word Puzzles with Your Microcomputer (Mau). Create your own crosswords, acrostics, cryptograms, word finds, quote-falls, fill-ins, and other word puzzles. This handy guide contains BASIC programs for producing both blank puzzles or printouts, which follow magazine format. Provides complete information for establishing and maintaining word and quotation files, as well as techniques for producing complex puzzles. In addition, the book serves as a tutorial on managing large text data bases. **\$14.95**

NEW! #5149 Codes, Ciphers, and Computers: An Introduction to Information Security (Bosworth). Describes the fundamentals of secret communication and provides an understanding of computer security through cryptography. Details and illustrates traditional cryptography techniques developed before computers and discusses more recent concepts for the highest levels of information and data security. **\$13.95**

NEW! #5174 Cryptanalysis for Microcomputers (Foster). Crack and create secret codes with your micro! An introduction to using microcomputers for solving cryptograms and cryptographic systems. Three BASIC programs are discussed: the first converts plaintext to ciphertext, the second converts ciphertext to plaintext, and the third uses mechanical aids and standard attacks on cryptograms. **\$14.95**



NEW! #5193 How to Cope with Computers (Logsdon). An entertaining yet informative discussion of the impact of computers on our lives and the future of our society. Interesting anecdotes illustrate how people are successfully coping with computers, from mainframes to micros. Includes an introduction to the BASIC programming language, an overview of computer career prospects, and a section on buying and operating a personal micro-computer. **\$10.95**

NEW! #5178 BASIC Computer Programs for Business, Vol. 2 (Sternberg). Designed for small businesses, entrepreneurs, and independent consultants, this book provides an invaluable variety of application programs that will make your micro-computer pay for itself as soon as it enters your office. Includes over 70 programs, each fully documented and demonstrated with a description of its application and operation, a listing in BASIC, a symbol table, sample data, and examples of printed output. Programs can easily be modified to meet your business's specific needs. **\$13.95**
Volume 1, request #5162, \$10.95

#5154 BASIC Computer Programs for the Home (Sternberg). Over 75 practical home application programs that will be helpful to the novice or experienced owner in increasing the usefulness of any home computer. Each program is documented with a description of its functions and operation, a listing in BASIC, a symbol table, sample data, and sample output. **\$10.95**

Hayden

Order Today



Available at your local computer store or order by phone
1-800-631-0856

Dept. #PC 02
In New Jersey
(201) 843-0550 ext. 382



Mail to:

Dept. #PC 02
Hayden Book Company, Inc.
50 Essex Street
Rochelle Park, NJ 07862

Method of payment:

☐ My check or money order is enclosed.

Please charge to my:

☐ Visa ☐ MasterCard

Residents of NJ and CA add sales tax.

Please send me the item(s) indicated below by code number.

--	--	--

If I am not completely satisfied, I may return the book(s) undamaged within 10 days for a complete refund.

Mr./Mrs.

Address

Apt. #

City

State

Zip

Visa/MasterCard #

Exp. Date

Signature

Prices subject to change

PC1082-004 B407

CIRCLE 177

QUALITY SOFTWARE FOR TRS-80 COLOR AND OSI

ADVENTURES AND QUEST ALSO FOR SINCLAIR AND VIC-20



ADVENTURES!!!

For TRS-80 COLOR and OSI. These Adventures are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are inter-active fantasies. It's like reading a book except that you are the main character as you give the computer commands like "Look in the Coffin" and "Light the torch.")

Adventures require 16k on TRS80, TRS80 color, and Sinclair. They require 8k on OSI and 13k on Vic-20. Derelict takes 12k on OSI. \$14.95 each.

ESCAPE FROM MARS

(by Rodger Olsen)

This ADVENTURE takes place on the RED PLANET. You'll have to explore a Martian city and deal with possibly hostile aliens to survive this one. A good first adventure.

PYRAMID (by Rodger Olsen)

This is our most challenging ADVENTURE. It is a treasure hunt in a pyramid full of problems. Exciting and tough!

TREK ADVENTURE (by Bob Retelle)

This one takes place aboard a familiar starship. The crew has left for good reasons — but they forgot to take you, and now you are in deep trouble.

HAUNTED HOUSE (by Bob Anderson)

It's a real adventure—with ghosts and ghouls and goblins and treasures and problems — but it is for kids. Designed for the 8 to 12 year old population and those who haven't tried Adventure before and want to start out real easy.

DERELICT

(by Rodger Olsen & Bob Anderson)

New winner in the toughest adventure from Aardvark sweepstakes. This one takes place on an alien ship that has been deserted for a thousand years — and is still dangerous!



VENTURER!—A fast action all machine code Arcade game that feels like an adventure. Go berserk as you sneak past the DREADED HALL MONSTERS to gather treasure in room after room, killing the NASTIES as you go. Great color, high res graphics, sound and Joystick game for the TRS-80 Color or OSI machines. (black and white and silent on OSI.) Tape only. \$19.95.

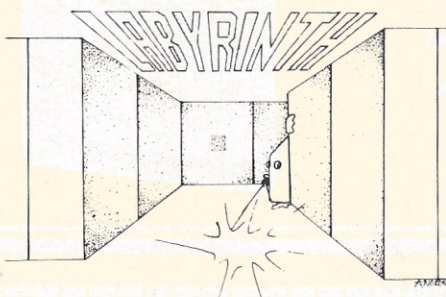
BASIC THAT ZOOOMMS!!

AT LAST AN AFFORDABLE COMPILER FOR OSI AND TRS-80 COLOR MACHINES!!! The compiler allows you to write your programs in easy BASIC and then automatically generates a machine code equivalent that runs 50 to 150 times faster.

It does have some limitations. It takes at least 8K of RAM to run the compiler and it does only support a subset of BASIC—about 20 commands including FOR, NEXT, END, GOSUB, GOTO, IF, THEN, RETURN, END, PRINT, STOP, USR (X), PEEK, POKE, *, /, +, -, >, <, =, VARIABLE NAMES A-Z, SUBSCRIPTED VARIABLES, and INTEGER NUMBERS FORM 0-64K.

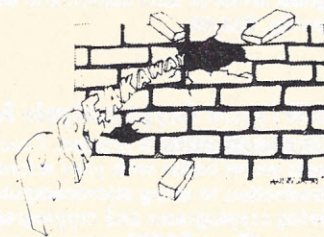
TINY COMPILER is written in BASIC. It generates native, relocatable 6502 or 6809 code. It comes with a 20 page manual and can be modified or augmented by the user. \$24.95 on tape or disk for OSI or TRS-80 Color.

LABYRINTH — 16K EXTENDED COLOR BASIC — With amazing 3D graphics, you fight your way through a maze facing real time monsters. The graphics are real enough to cause claustrophobia. The most realistic game that I have ever seen on either system. \$14.95. (8K on OSI)



QUEST — A NEW IDEA IN ADVENTURE

GAMES! Different from all the others. Quest is played on a computer generated map of Alesia. Your job is to gather men and supplies by combat, bargaining, exploration of ruins and temples and outright banditry. When your force is strong enough, you attack the Citadel of Moorlock in a life or death battle to the finish. Playable in 2 to 5 hours, this one is different every time. 16k TRS-80, TRS-80 Color, and Sinclair. 13K VIC-20. \$14.95 each.



NEW!!

BREAKAWAY — ALL MACHINE CODE — Every computer has some form of BREAKAWAY available. Ours is fast, smooth, has 15 levels of difficulty — and is a bargain!! 16k TRS-80 Color only \$9.95.

PROGRAMMERS!

SEE YOUR PROGRAM IN THIS SPACE!!

Aardvark traditionally pays the highest commissions in the industry and gives programs the widest possible coverage. Quality is the keyword. If your program is good and you want it presented by the best, send it to Aardvark.

Please specify system on all orders

ALSO FROM AARDVARK — This is only a partial list of what we carry. We have a lot of other games (particularly for the TRS-80 Color and OSI), business programs, blank tapes and disks and hardware. Send \$1.00 for our complete catalog.

AARDVARK - 80

2352 S. Commerce, Walled Lake, MI 48088

(313) 669-3110

Phone Orders Accepted 8:00 a.m. to 4:00 p.m. EST. Mon.-Fri.

TRS-80 COLOR

SINCLAIR

OSI

VIC-20

JINSAM™ EXECUTIVE™

space
age
micro
software



used at NASA,
Kennedy Space Center
with Multiple Applications Related
to the Columbia Space Shuttle Project
including rescue operations, statistical
reports, inventory and vehicle tracking.

JINSAM EXECUTIVE™

has broken the 10,000 record limit. You
may now have up to 65,000 records in one
database.

We also have included a free form
report generator for data entry, elimi-
nating the need for WordPro™ and have
included automatic mathematical relations
eliminating the need for VisiCalc™. How-
ever, you still have these superb interfaces
available.

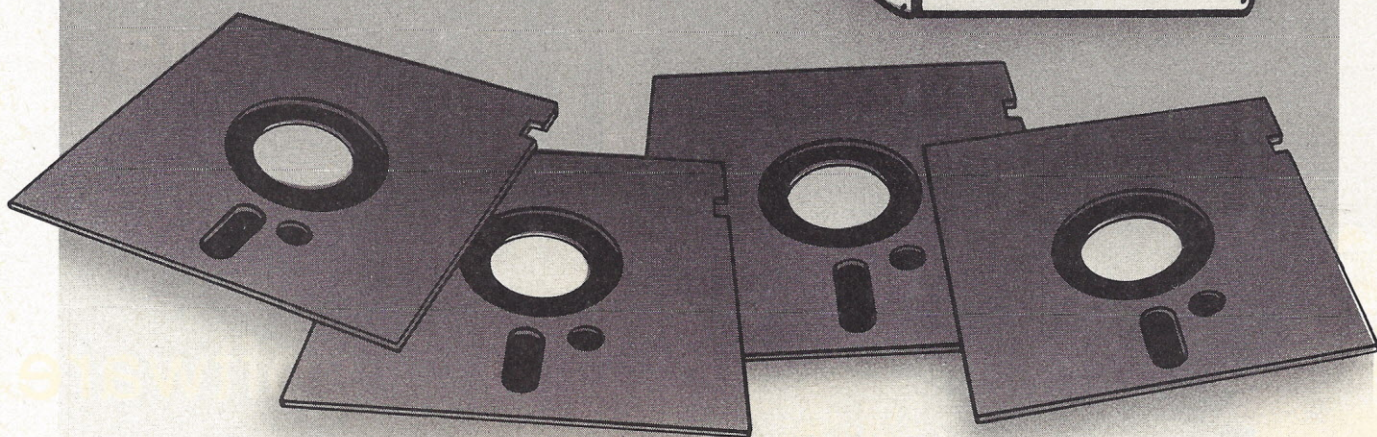
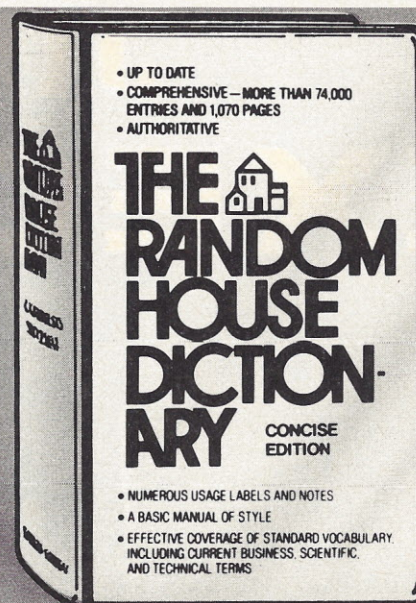
Executive™ will be available for CBM
and IBM personal computers.

JINI MICRO-SYSTEMS, Inc.

DATABASE MANAGEMENT SYSTEM DESIGN

BOX 274 KINGSBRIDGE STN., RIVERDALE, N.Y. 10463 (212) 796-6200

WE'VE CHANGED MORE ON THE APPLE SPELLER THAN JUST THE NAME



You get 85,000 words on disk with THE SENSIBLE SPELLER and a Random House dictionary to boot!

THE SENSIBLE SPELLER™ is the first COMPLETE spelling verification program for the Apple Computer. NO other spelling program includes as many options, or has a dictionary (on diskette) as large as ours, and includes a well known dictionary, too. THE SENSIBLE SPELLER now features the complete CONCISE EDITION of the RANDOM HOUSE® DICTIONARY. If you question the definition, pronunciation, or spelling of any word, you can simply look it up in the supplied hardcover dictionary.

Four versions of THE SENSIBLE SPELLER are available. There is no need to MUFFIN or transfer your files from one operating system to another.

- The **DOS 3.3 version** works with Applewriter (I or II), Apple Pie, The Correspondent, Executive Secretary, Letter Perfect, Magic Window, Screenwriter (formerly Superscribe), Text Editor, TXT/ED, Write-On, Word Power, or any other word processor, editor, or program that generates standard DOS 3.3 TEXT or BINARY files.

- The **Super Text™ version** works with Super Text, Super Text II, and the new 80-column version of Super Text.
- The **CP/M™ version** works with WordStar, ED, Magic Wand, Type Master, and any other word processor that does not compact text.
- The **Pascal™ version** works with the Pascal Editor, and Prose.

Numerous options are provided throughout the program to enable you to completely control all activities of THE SENSIBLE SPELLER. These include the ability to ignore both formatting commands and control codes, multiple options for the action taken with each misspelled word, and the use of multiple dictionaries. An alphabetical listing of misspelled, unknown, and/or all words in your document along with usage frequencies may be listed. A verification mode is provided to allow you to examine and dispense with misspelled words while viewing them in the actual context in which they appeared in your file. When you encounter an unknown word, you can even search the dictionary for the correct spelling (using wildcards). In the near future, Sensible Software will be releasing well known legal and medical dictionaries to complete this professional package.

THE SENSIBLE SPELLER package includes:

- an easy to read instruction manual
- two copies of THE SENSIBLE SPELLER program
- a main dictionary diskette, containing 45,000 of the most commonly used English language words (there is room to add approximately 10,000 of your own words)
- a supplementary dictionary diskette, containing the remaining 40,000 words in the CONCISE EDITION of the RANDOM HOUSE DICTIONARY
- the hard cover RANDOM HOUSE DICTIONARY, CONCISE EDITION

THE SENSIBLE SPELLER requires an Apple™ II/Apple™ II+ equipped with 48K, DOS 3.3, and 1 or 2 disk drives. Two disk drives are required to delete or add words to the dictionary. The price is only \$125.00.



6619 Perham Drive, Dept. PC
West Bloomfield, Michigan 48033
(313) 399-8877
Visa and Mastercard Welcome.
Add \$1.25 postage and handling per program.
For a complete catalog, send \$1.00, refundable with your first purchase.

• APPLE is a registered trademark of APPLE Computer Company • CP/M is a registered trademark of Digital Research Corp. •
• SUPER TEXT is a registered trademark of Muse Software • APPLE PASCAL is a registered trademark of U.C.S.D. •
RANDOM HOUSE and the House design are registered trademarks of Random House, Inc. Copyright 1982 Random House, Inc.

PERSONAL COMPUTING DEALERS

Many of the products and services listed in *Personal Computing* are available from the dealers listed here. This listing is in area-code order for easy reference. Retailers: If you would like to become a *Personal Computing* dealer, please call Merri Hollander, (201) 843-0550, ext. 313 for information.

ALASKA

Empire Electronic/Anchorage (206) 244-5200
Computerland/Anchorage (907) 272-1518
Electronics Supply Center Inc./Anchorage (907) 277-2142

ALABAMA

Anderson Computers/Huntsville (205) 539-3444
Computerland/Mobile (205) 344-4401
Computerland/Anniston (205) 237-5600
Madison Books (205) 772-9250
Olensky Brothers/Mobile (205) 344-7448
University Supply Store/Tuscaloosa (205) 348-6168

ARKANSAS

Vaughn Electronics Corp/Rogers (501) 636-2343

ARIZONA

Computerland/Phoenix (602) 956-5727
Computerland/Tempe Mesa (602) 962-6732
Computerland/Tucson (602) 297-7023
Computerland of Metro/Phoenix (602) 861-1394
The Computer Store/Phoenix (602) 866-0258
Dataplace/Tempe (602) 266-6111
Desert News/Tucson (602) 747-0428
Electronic Parts Co., Inc./Phoenix (602) 277-7281
Food for Thought/Tucson (602) 327-9481
Heathkit Electric Center/Phoenix (602) 279-6247
Metro Computer Store/Tucson (602) 323-3116
Personal Computer Place/Mesa (602) 833-8949
The Xerox Store/Mesa (602) 898-9304
The Xerox Store/Phoenix (602) 861-3256

CALIFORNIA

Computerland/Stockton (209) 473-1241
Computers Etc./Stockton (209) 957-9500
Electric Brain/Fresno (209) 227-8479
Harding Way News/Stockton (209) 464-7514
Micro Pacific Computer Ctr./Fresno (209) 229-0101
Sunrise Computer Products/Merced (209) 383-9026
A-Vidd Electrs. Co./Long Beach (213) 598-0444
Computer Components/Van Nuys (213) 786-7411
Computer Forum/Santa Fe Springs (213) 921-2111
Computer Seen/Long Beach (213) 438-7469
Computer Store/Santa Monica (213) 451-0713
Computerland/Lawndale (213) 371-4624
Computerland/Glendale (213) 246-2453
Computerland/Pasadena (213) 449-3205
Computerland/San Fernando (213) 716-7714
Computerland/Torrance (213) 543-2221
Computers are Fun/Los Angeles (213) 475-5467
Dow Radio/Pasadena (213) 793-1195
Heathkit Electro Center/Los Angeles (213) 749-0261
HW Computers/Northridge (213) 886-9200
HW Computers (213) 370-5556
Levity Distributors/N. Hollywood (213) 982-2514
O Pump Technical Books/Los Angeles (213) 464-4322
Personal Power/Canoga Park (213) 703-7921
Rainbow Computing/Northridge (213) 349-0300
Soft Byte/Tarzana (213) 345-9000
Software Central/Pasadena (213) 793-4101
Software Etc./Woodland Hills (213) 702-8918
Software Store/Los Angeles (213) 473-1136
The Software Affair/Bell Flower (213) 920-3129
Unicom, Inc./Tazana (213) 451-8089
The Xerox Store/Encino (213) 907-1415
The Xerox Store/Pasadena (213) 793-0228
The Xerox Store/Santa Monica (213) 451-0866
The Xerox Store/Torrance (213) 316-5163
Advanced Computer Prods./San Jose (408) 946-7010
Central Campbell Computers/Campbell (408) 370-0199
Computerland/San Jose (408) 267-2182
Computerland/Santa Clara (408) 246-4500
Computerland (408) 253-8080
Computerland (408) 988-1413
Computer Place (408) 624-7111
Computer Plus (408) 735-1199
Computer Post (408) 244-5300
Computer Works (408) 257-7863
Heathkit Electro Center (408) 377-8920
Peninsula Computer Ctr. (408) 424-2103
Poor Richard's Almanac (408) 425-1991
Quement Electrs. (408) 998-5900

The Xerox Store/San Jose (408) 248-9000
The Xerox Store/Sunnyvale (408) 732-4222
Zackit Monterey (408) 375-3144
Berkeley Computer (415) 526-5600
Byte Shop No. 1 (415) 969-5464
Computer Center (415) 845-6366
Computer Post/Newark (415) 790-0410
Computer Store/San Leandro (415) 569-4174
Computerland (415) 794-9311
Computerland/El Cerrito (415) 527-8844
Computerland/Los Altos (415) 941-8154
Computerland/San Francisco (415) 546-1592
Computerland San Francisco/Van Ness (415) 563-4414
Computerland/Walnut Creek (415) 935-6502
Computerland of the Castro (415) 864-8080
Friendly Software (415) 593-8275
Heathkit Electrs. (415) 236-8870
Infosoft Systems (415) 680-0324
Keplers' Books (415) 948-5666
Marin Computer Center (415) 472-2650
Micro Age Computer Store (415) 680-1489
Micro Age Computer Store (415) 964-7063
Micro Tutor (415) 828-7884
Mission Computer Center (415) 326-9689
P C Computers (415) 527-6657
Printers (415) 327-6500
Robotek/El Cerrito (415) 524-3730
Software Emporium (415) 941-8788
Stacey's Bookstore (415) 326-0681
Sunset Computers (415) 665-7378
Systems Formulate (415) 281-2621
Technika Berkeley (415) 524-8934
Computer Scene (707) 462-1578
Santa Rosa Computer Ctr. (707) 528-6480
Zackit Vallejo (707) 644-6676
Advanced Computer Prods. (714) 558-8813
Apple of Orange (714) 974-3082
Byte Shop (714) 565-8008
Capistrano Computers (714) 661-7250
Computer Age (714) 565-4042
The Computer & I (714) 552-0503
Computer Merchant (714) 583-3963
Computer Metrics (714) 579-8066
Computer Post (714) 695-2000
Computer Store/Chula Vista (714) 281-0285
Computer World (714) 891-2584
Computerland (714) 464-5656
Computerland (714) 560-9912
Computerland/Laguna Hills (714) 859-8912
Computerland/North (714) 434-3300
Computerland/San Bernardino (714) 886-6838
Computerland/W. Los Angeles (714) 560-9912
Consumer Computers (714) 465-8888
CTC—The Computer People (714) 565-0505
HBJ Bookstore (714) 238-1255
Heathkit Electro Center (714) 776-9420
Idea Computers (to come)
Integrated Circuits Unltd (714) 278-4393
James Games Computer Center (714) 985-3278
Marvac Electrs. (714) 540-3280
Net Profit Computers (714) 750-7318
Sorbis Station (714) 549-8505
The Wabash Apple (714) 768-3236
The Xerox Store/Brea (714) 671-0794
The Xerox Store/Costa Mesa (714) 646-8941
The Xerox Store/Costa Mesa (714) 641-9099
The Xerox Store/Huntington Beach (714) 898-8066
The Xerox Store/Long Beach (714) 898-8066
The Xerox Store/Concord (714) 898-8066
Byte Shop (805) 647-8945
Compusup (805) 942-5747
Computer Plaza (805) 687-9391
Computer Plus (805) 963-4542
Computer Shop (805) 963-1325
Computer Solutions (805) 922-6639
Computer Sound (805) 945-5921
Computerland of Santa Barbara (805) 967-0413
Computers To-Go (805) 496-2868
Dow Radio (805) 486-6353
QPSB Personal Electr. (805) 967-7100
Ventura County Computer Center (805) 648-5059
Byte Shop/Sacramento (916) 961-2983
Capitol Computer (916) 483-4729
Computer Place (916) 221-1312
Computerland/Redding (916) 241-7922
Computerland/Sacramento (916) 920-8981
On Line Computer Center (916) 338-5447
Student Bookstore (916) 895-6044

COLORADO

Aparat/Denver (303) 741-1778

Computer Connection/Englewood (303) 449-8282
Computer Connection/Boulder (303) 449-8282
Computer Shack/Pueblo (303) 564-3545
Computerland/Colorado Springs (303) 574-4170
The Xerox Store/Aurora (303) 695-8660
The Xerox Store/Denver (303) 825-2386
The Xerox Store/Denver (303) 692-0414
Whole Life Distributor/Denver (303) 861-2825

CONNECTICUT

Aetna Life Club Store/Hartford (203) 273-3058
Anchor Microsystems/Westport (203) 222-1259
Bright Ideas/Gilford (203) 453-6665
Computer City/W. Hartford (203) 521-2245
Computer City/New Haven (203) 562-7546
Computer Ease/Milford (203) 877-7447
Computer Store (203) 563-9000
Computer Store (203) 356-1920
Computer Store (203) 627-0188
Computerland (203) 235-9204
Computerland/New Haven (203) 273-4807
Exel Sys./Stamford (203) 348-5894
Harold's Drugs/Bristol (203) 583-1854
Logical Systems Inc./Farmington (203) 677-4557
Micro Age Computer Store/Greenwich (203) 629-8171
Microworld Computer, Inc./Danbury (203) 797-1623
Technology Sys./Bethel (203) 748-6856
The Xerox Store/Hartford (203) 233-9871

DELAWARE

Computerland/New Castle/Newark (302) 738-9656
Computer Store/Wilmington (302) 478-7772
Micro Products/Wilmington (302) 762-0227
The Smoke Shop/Wilmington (302) 655-2861

DISTRICT OF COLUMBIA

Computer Store (202) 272-0294
Pentagon Book Stores (202) 695-0870
Program Store (202) 337-4693
Students Book Co. (202) 223-3327

FLORIDA

Evans Business Computer Sys (209) 576-0451
A I Personal Computer/Longwood (305) 339-8914
Allstate Business Center Ltd./Miami (305) 665-1013
Baron Electronic Sales/Hialeah Gardens (305) 556-1300
Byte Shop of Miami (305) 264-2983
Clarks Out of Town News/Ft. Lauderdale (305) 467-1543
Computer Ctr./Palm Beaches (305) 689-3233
Computer Image/Miami (305) 271-1224
Computer Scene/Miami (305) 945-1014
Computer Scene/N. Miami Beach (305) 238-7238
Computerland (305) 862-6202
Computerland/Boca Raton (305) 368-1122
Computerland/Ft. Lauderdale (305) 566-0776
Computerland/W. Palm Beach (305) 684-3338
Electronic Equipment Co./Miami (305) 871-3500
H.I.S. Computerization/Melbourne (305) 254-9399
Lighthouse Book Store/Lighthouse Pt. (305) 781-1945
Micro Age Computer Store/W. Palm Beach (305) 683-5779
Programs Unlimited/W. Palm Beach (305) 689-1200
Sunnys At Sunset, Inc./Sunrise (305) 741-2070
The Xerox Store/Altamonte Springs (305) 831-3100
The Xerox Store/Ft. Lauderdale (305) 524-4663
The Xerox Store/Miami (305) 667-5441
The Xerox Store/N. Miami Beach (305) 947-9346
The Xerox Store/Orlando (305) 898-5000
The Computer Chip/Bradenton (813) 792-2188
Computerland/Clearwater (813) 785-5579
Computerland/Seminole (813) 392-0771
Computerland/Tampa (813) 971-1680
Computerland of Lakeland (813) 644-6437
Computers Etc./Lakeland (813) 683-3933
Extra Extra Newstand/Tampa (813) 886-1802
H & H Hobby Sales/Sarasota (813) 922-7711
Henry's News Stand (813) 536-3863
Micro Computer System Inc. (813) 879-4301
New World Computer/Bradenton (813) 748-5485
Poling Place/Pinellas Park (813) 541-2729
The Xerox Store/Clearwater (813) 796-7507
The Xerox Store/Tampa (813) 977-8301
The Xerox Store/Tampa (813) 876-7439
Computer Store/Gulf Breeze (904) 932-0660
Computer Sys. Resource (904) 376-4276
Computerland/Jacksonville (904) 731-2471
Computerland/Tallahassee (904) 224-9341
Florida Book Store/Gainesville (904) 376-0666
Goerings Book Ctr./Gainesville (904) 378-0363
Grice Electrs. Inc./Pensacola (904) 477-8100
Vitech/Tallahassee (904) 893-1743

PERSONAL COMPUTING DEALERS

GEORGIA

Atlanta Computer Mart/Atlanta (404) 455-0647
 Baileys Computer Shop (404) 790-5771
 Competitive Edge, Inc./Peachtree City (404) 487-6460
 Computerland/Atlanta/Smyrna (404) 953-0406
 Guild News Agency/Atlanta (404) 252-4166
 Micro-Graphics Systems, Inc./Augusta (404) 790-5771
 The Xerox Store/Atlanta (404) 938-1276
 The Xerox Store/Atlanta (404) 233-9025
 The Xerox Store/Smyrna (404) 952-3901
 Computer Gazebo/Savannah (912) 232-8888
 Electronics 21 Inc./Savannah (912) 352-0585
 Grey Communications Cons./Albany (912) 883-2121

HAWAII

Amtec Inc./Honolulu (808) 955-7429
 Computer Center/Pearl City (808) 448-2171
 Computerland/Hawaii/Honolulu (808) 521-8002
 Radio Shack No. 7086/Aiea (808) 487-1509

IDAHO

Computer Co. Inc./Boise (208) 375-9381
 Electronic Specialties/Boise (208) 376-5040
 Northwest Computer Ctr./Boise (208) 375-6681

ILLINOIS

Byte Shop/Champaign (217) 352-2323
 Computerland/Champaign (217) 359-0895
 Computer-Ease/Macomb (309) 833-3886
 Wallace Micro-Mart Inc./Peoria (309) 685-7876
 ABC Byte Shop/Skokie (312) 673-3550
 Book Market/Chicago (312) 944-3358
 Book Market/Chicago (312) 440-4475
 Byte Shop/LaGrange (312) 579-0920
 Complete Computing/Lombard (312) 620-0808
 Compshop/Rolling Meadows (312) 593-1800
 Computerland (312) 949-1300
 Computerland (312) 967-1714
 Computerland/Naperville (312) 369-3511
 Computerland/Northbrook (312) 272-4703
 Computerland/Oak Lawn (312) 422-8080
 Computerland/Oak Park (312) 383-1606
 Computerland/Schaumburg (312) 253-3009
 Computerland of St. Charles (312) 377-7200
 Data Domain/Schaumburg (312) 397-8700
 Erickson Communication/Chicago (312) 631-5181
 Illinois Microcomputer/Naperville (312) 420-8813
 Kroch's & Brentano's/All stores (312) 332-7500
 Micro Computer Ctr./Geneva (312) 232-1545
 Nabih's Inc./Evanston (312) 869-6140
 Northbrook Computers (312) 480-9190
 Oak Brook Computer Ctr. (312) 941-9005
 Page One/Roselle (312) 529-9060
 Prairie News Agency/Chicago (312) 384-5350
 Sorbus Station/Bensenville (312) 459-8560
 The Book Store/Arlington Hgts. (312) 255-8040
 Wine Micro Computers (312) 420-8813
 Univ. Bookstore/Carbondale (618) 536-3321
 Alpine Computer Ctr./Rockford (815) 229-0200
 Appletree Computer/DeKalb (815) 758-8666
 Computer Store/Rockford (815) 962-7580
 Computerland/Joliet (815) 741-3303

INDIANA

Computer Plus (219) 865-3930
 Computerland/Ft. Wayne (219) 483-8107
 Computerland/Mirabel (219) 769-8120
 Computerland/Mishawaka (219) 256-5688
 Data Base/Ft. Wayne (219) 484-3164
 Computercraft/Carmel (317) 846-5996
 Computerland/Anderson (317) 649-1122
 Graham Electrs./Indianapolis (317) 634-8202
 Data Domain/Bloomington (812) 334-3607
 Hoosier Electrs./Terre Haute (812) 232-8508

IOWA

Computer Country, Inc./Marion (319) 377-9437
 Memory Bank/Bettendorf (319)
 386-3330/Memory Bank/Clinton (319) 242-2755
 The Partstore/ Marion (319) 373-1803

KANSAS

Amateur Radio Equip./Wichita (316) 264-9166
 Computerland/Hutchinson (316) 662-6832
 Computerland/Wichita (316) 684-3870
 High Technology/Wichita (316) 262-0315
 Book Shop/Manhattan (913) 537-8025
 Computerland (913) 492-8882
 Computerland/Lawrence (913) 841-8611
 Computerland/Topeka (913) 267-6530
 Online Computer Centers/Overland Pk. (913) 341-6651
 Personal Computer Ctr./Overland Pk. (913) 649-5942
 The Computer Room/Beatty (913) 341-3500

KENTUCKY

Computer Emporium/Louisville (502) 589-9482
 Heathkit Electr./Louisville (502) 245-7811

Computer Place/Lexington (606) 276-3594
 Computer World/Ashland (606) 329-0545
 MicroAge Computer Store/Lexington (606) 278-0304

LOUISIANA

Computer Shoppe Inc./Metairie (504) 454-6600

MAINE

Coastal Computer Center/Brunswick (207) 729-0298
 Retail Computer Ctr./Elsworth (207) 669-6736

MARYLAND

Balance Corp. Center Inc./Baltimore (301) 625-1100
 Bethesda Computers (301) 657-1982
 Chafitz/Rockville (301) 340-3300
 The Comm. Center/Laurel (301) 782-0600
 Computer Strategies Inc./Gaithersburg (301) 840-2173
 Computer Unlimited/Towson (301) 321-1553
 Computers Etc./Annapolis (301) 268-5801
 Computerland (301) 340-8484
 Computerland/Towson (301) 337-5555
 Fredericks Computer Products/Frederick (301) 684-8884
 Heathkit Electrs. (301) 881-5420
 Komar Ltd./Baltimore (301) 675-2200
 Logical Choice/Ellicott City (301) 465-3175
 Program Store/Baltimore (301) 944-0200
 Radio Shack/Annapolis (301) 273-3146
 The Xerox Store/Rockville (301) 424-1450

MASSACHUSETTS

Computer Source/Pittsfield (413) 443-7181
 Retail Computer Ctr./Ludlow (413) 589-0106
 Computer City (617) 755-5464
 Computer City (617) 875-8126
 Computer City (617) 273-3146
 Computer City (617) 242-3350
 Computer City (617) 826-9217
 Computer City (617) 774-7118
 Computer Store/Sudbury (617) 232-5470
 Computer Store/Cambridge (617) 354-4599
 Computerland/Boston (617) 235-6652
 Computerland/Boston (617) 482-6033
 Eden Microcomputers/Osterville (617) 428-3515
 The Game Shop/Acton (617) 263-0418
 Harvest Computer/Cambridge (617) 547-3289
 Heathkit Electrs./Wellesley (617) 237-1510
 Land of Electronics/Saugus (617) 581-3133
 New England Electronics CO/Needham (617) 449-1765
 Ni-Ni's Corner, Inc./Cambridge (617) 547-3558
 Out of Town News/Cambridge (617) 354-7777
 Palace Spa/Brighton (617) 783-5858
 Retail Computer Ctr. (617) 935-8060
 Small Business Group/Westford (617) 692-3800
 Video Station/Woburn (617) 933-1445
 YDI Electrs./Needham (617) 449-1005
 The Xerox Store/Boston (617) 451-5800
 The Xerox Store/Burlington (617) 273-5665
 The Xerox Store/Chestnut Hill (617) 566-1707

MICHIGAN

Binary Corp/Berkley (313) 548-0533
 Community News Center (313) 662-6150
 Computer Center/W. Bloomfield (313) 422-2570
 Computer Connection/Farmington Hills (313) 447-4470
 Computer Contact, Inc./Grand Blanc (313) 694-3704
 Computer Horizons (313) 464-6502
 Computer Mart (313) 649-0910
 Computer Mart/Flint (313) 234-0161
 Computerland (313) 973-7075
 Computerland/Southfield (313) 356-8111
 The Family Computer Center/Berkley (313) 546-8114
 Front Page Bookstore/Pontiac (313) 332-3431
 Heathkit Electr./Detroit (313) 772-0416
 Heathkit Electr. Ctr./Detroit (313) 535-6480
 Metro News #2/Birmingham (313) 851-7121
 New Horizons Book Shop/Roseville (313) 296-1560
 Rainbow Computers/Troy (313) 528-3535
 Rochester Book Center (313) 651-0199
 Simtec/Birmingham (313) 855-3990
 Spectrum Computers/Lathrup Village (313) 559-5252
 Community Newscenter (517) 694-0490
 Community Newscenter (517) 349-3510
 Computer Mart/Lansing (517) 351-1777
 Computerland/Grand Rapids (616) 942-2931
 Computers & More/Grand Rapids (616) 243-3525
 Professional Data Corp./Marquette (906) 228-2626

MINNESOTA

Granada News/Duluth (218) 727-9122
 Readmore Book & Card/Mankato (507) 345-5704
 Apple A Day/St. Paul (612) 293-9062
 Computer Depot/Bloomington (612) 375-2008
 Computer Professionals/Burnsville (612) 435-8060
 Computerland (612) 559-1984
 Digital Den/St. Paul (612) 699-8442
 Micro Age Computer Store/Minneapolis (612) 338-1777

Minnesota Book Center/Minneapolis (612) 373-5734
 Personal Business Systems/Minneapolis (612) 929-4120
 Readmore Bookstore/Minneapolis (612) 333-3628
 Schindler's Hennepin News/Minneapolis (612) 333-6942
 Shinder Book & News/St. Paul (612) 227-0899
 The Xerox Store/Edina (612) 929-4334
 The Xerox Store/Minneapolis (612) 332-6866
 The Xerox Store/St. Paul (612) 227-3366

MISSISSIPPI

The Book Store/Greenville (601) 332-2665
 Computerland/Jackson (601) 362-8755
 Miss-Lou Computer Center/Natchez (601) 442-2836
 Southeastern Aud. Vis./Starkville (601) 324-0797

MISSOURI

Computer Center/St. Louis (314) 444-3111
 Computer Country-North (314) 921-5644
 Computerland/St. Louis (314) 567-3291
 Famous-Barr Computer Ctr./St. Louis (314) 241-5469
 Gateway Electrs/St. Louis (314) 427-6116
 Micro-Age Computer Ctr./St. Louis (314) 567-7644
 Computer Mart/Springfield (417) 862-6500
 House of Computers/Joplin (417) 782-0880
 Computerland (816) 436-3737
 Computerland (816) 364-4498
 Computerland/Independence (816) 461-6502

MONTANA

Computerland/Billings (406) 259-0565
 Computerland/Great Falls (406) 767-8700
 Consolidated Services/Amissonla (406) 721-1811
 Prairie Computers/Great Falls (406) 727-6992

NEBRASKA

Computerland/Omaha (402) 391-6716
 Electronic Center/Lincoln (402) 476-7331

NEVADA

Computerland/Las Vegas (702) 369-2001
 Home Computers/Las Vegas (702) 736-6363
 PCS Computer Service/Las Vegas (702) 870-4138

NEW HAMPSHIRE

Bitznbytes/Concord (603) 224-8233
 Computer City (603) 898-2390
 Computer City (603) 668-9527
 Computerland/Nashua (603) 889-5238
 Computer Mart (603) 883-2386
 Computer Town/Salem (603) 893-8812
 Strictly Software/Hudson (603) 883-5005

NEW JERSEY

Apple Corr/Basking Ridge (201) 766-3977
 Computer Corner (201) 835-7080
 Computer Dimensions/Westfield (201) 232-8300
 Computerland (201) 845-9303
 Computerland/Eatontown (201) 389-2333
 Computerland/Morristown (201) 539-4077
 Computer Mart of New Jersey/E. Hanover (201) 428-0200
 Computer Mart of New Jersey/Green Brook (201) 752-6300
 Computer Mart of New Jersey/Iselin (201) 283-0600
 Computer Nook/Pine Brook (201) 575-9468
 Computer Technicians/E. Brunswick (201) 238-2780
 Computer Universe/Paramus (201) 262-0960
 Earth Rise Micro Sys./Madison (201) 822-0518
 Heathkit Electr. Ctr./Fairlawn (201) 791-6935
 Lloyd's Computers/Ridgewood (201) 445-8801
 Software City/Teaneck (201) 692-8317
 Stonehenge Computer/Summit (201) 277-1020
 The Computer Center, Inc./Montvale (201) 391-1006
 Bargain Brothers/Trenton (609) 883-2050
 Computer Encounter/Princeton (609) 924-8757
 Computer Mart of New Jersey/Lawrenceville (609) 452-1858
 The Computer Port/Northfield (609) 641-4300
 Computer Workshop/Cherry Hill (609) 665-4404
 Computerland/Cherry Hill (609) 795-5900
 Personal Computing (609) 927-3880
 Radio Shack/Moorestown (609) 244-7494
 Radio Shack/Toms River (609) 234-2666
 Sorbus Station (609) 662-0997

NEW MEXICO

Computer Shop/Clovis (505) 762-3327
 Computerland/Santa Fe (505) 988-8800
 Electronic Parts Co./Albuquerque (505) 293-6161
 Micro Waves Computer Store/Albuquerque (505) 883-0955
 Computer Tech Assoc./Las Cruces (915) 533-2108

NEW YORK

Computer Center/New York (212) 889-8130
 Computer Discount Services/New York (212) 757-8698
 The Computer Edge/Mt. Kisco (212) 664-3212

Computer Era/New York	(212) 860-0500	Employee's Assoc. Bookstore/Okla. City	(405) 686-4295	Northwest Newstand/Houston	(713) 681-7310
Computerland	(212) 840-3223	High Technology Retail/Okla. City	(405) 528-8008	Waghalter Books/Houston	(713) 627-9970
Computerland of Little Neck	(212) 423-5280	Micro Age Computer/Okla. City	(405) 728-1837	Westheimer Newstand/Houston	(713) 781-7793
Comtek/Brooklyn	(212) 332-5933	Computer Store/Tulsa	(918) 224-5347	The Xerox Store/Houston	(713) 972-1791
Comtek/Staten Island	(212) 698-7050	Computerland/Tulsa	(918) 481-0332	The Xerox Store/Houston	(713) 654-8913
Datel Sys./New York	(212) 921-0110	OREGON		The Xerox Store/Richardson	To Come
Harcourt Brace Bookstore/New York	(212) 888-3333	Byte Shop/Beaverton	(503) 644-2686	Young Electrs./College Station	(713) 693-8080
Leigh's Computer World/New York	(212) 879-6257	Computer Solutions/Eugene	(503) 689-9677	Agriplex Computers/Lubbock	(806) 797-4495
Magazine Emporium/New York	(212) 864-0500	Computer Specialties/Salem	(503) 399-0534	Computerland/Waco	(817) 776-6700
Majority New Dist./New York	(212) 243-7770	Computer Store/Corvallis	(503) 754-0811	Computer Port/Arlington	(817) 469-1502
Papyrus Books/New York	(212) 864-8862	Computerland/Portland	(503) 620-6170	Computer Pro/Ft. Worth	(817) 654-3360
Programs Unlimited of Smithaven	(to come)	C 2 E	(503) 245-9785	Heathkit	(817) 737-8822
R D International Co./LI City	(212) 307-0266	Fifth Avenue News/Portland	(503) 222-7462	Waco Comm.	(817) 772-8550
Super Business Machines/New York	(212) 964-6666	Micro Age Computer Store/Portland	(503) 256-4713	Computer Tech Assoc./El Paso	(915) 533-2108
Computerland/Massina	(315) 769-9971	New Day Computing/Portland	(503) 223-8033	Computer West	(915) 655-3391
Computers Etc./Syracuse	(315) 446-6502	Rich Cigar Store/Portland	(503) 228-1700	UTAH	
Radio World, Inc./Oriskany	(516) 736-0184	PENNSYLVANIA		Computerland/Orem	(801) 224-2608
Berliner Computer Ctr./New Hyde Pk.	(516) 775-4700	A B Computers/Montgomeryville	(215) 822-7727	Computerland/Salt Lake	(801) 364-4416
Computer Headquarters	(516) 698-8636	Computer Forum/Frazer	(215) 296-3474	Quality Technology/Salt Lake City	(801) 521-5040
Computer Microsystems/Manhasset	(516) 627-3640	Computerland/Dresher	(215) 542-8835	VIRGINIA	
Computer Shoppe/Patchogue	(516) 758-6558	Computerland/Lancaster	(215) 436-0422	Computer Store/McLean	(617) 272-0294
Computerland/Little Neck	(516) 887-4747	Computerland/Lehigh Valley	(215) 776-0202	Arlington Electric Wholesale/Arlington	(703) 524-2412
Computerland/Nassau County	(516) 742-2262	Computerland/Paoli	(215) 296-0210	Computer Place	(703) 982-3661
Data Scan Comp. Sys./Farmingville	(516) 698-6285	The Computer Source/W. Reading	(215) 375-4231	Computers Plus/Alexandria	(703) 971-1996
Future Visions Computer/Melville	(516) 423-7820	Doc's Computer Supply Center/Ardmore	(215) 642-6550	Computerland	(703) 491-4151
Harrison Radio/Farmingdale	(516) 293-7990	Drexel University Book Store	(215) 895-2000	Computerland/Tyson's Corner	(703) 893-0424
Heathkit Electrs./Jericho	(516) 334-8181	Heathkit Electr. Ctr./Frazer	(215) 288-0180	H.B. Computer Ctr.	(703) 295-1975
Programs Unlimited/Jericho	(516) 997-8668	Heathkit Electr. Ctr./Philadelphia	(215) 647-5555	Heathkit Electrs.	(703) 765-5515
Spartan Electrs/Commack	(516) 499-9500	Main Line Computer Center/Wayne	(215) 687-8500	Home Computer Ctr./Newport News	(703) 595-1955
Syosset Video & Electrs./Syosset	(516) 921-5454	Marketline Sys./Huntington Valley	(215) 947-6670	Program Store/Falls Church	(703) 536-5404
Castle Computers/Latham	(518) 783-9405	Micro Computer Center/Media	(215) 565-1380	Virginia Micro Sys./Woodbridge	(703) 491-6502
Computer Room/Albany	(518) 869-3818	Mighty Byte Computer Ctr./Horsham	(215) 443-9020	V.P.I. Facilities/Blacksburg	(703) 961-5991
Future Distribution/Mogers	(518) 561-5703	Computer House/Pittsburgh	(412) 921-1333	The Xerox Store/Fairfax	(703) 591-8845
Lela Computer Suitsors/Albany	(518) 272-2691	Computer Workshope/Monroeville	(412) 823-6722	The Xerox Store/Vienna	(703) 442-9655
Computer Tree/Endwell	(607) 748-1223	Erie Computer Co./Erie	(412) 454-7652	Computerland	(804) 973-5701
Computerland/Ithaca	(607) 277-4888	Pittsburgh Computer Store/Pittsburgh	(412) 391-8050	Computerland/Richmond	(804) 741-3536
Computerland/Johnson City	(607) 277-4888	Computer Store/State College	(717) 272-0294	Data Base/Richmond	(804) 282-1817
Unicorn Electronics/Johnson City	(607) 798-0260	One Step Computer Shoppe	(717) 761-6754	Home Computer Ctr.	(804) 340-1977
Computer Resource/Williamsville	(716) 633-9510	Computerland/Harrisburg	(814) 533-6892	WASHINGTON	
Computerland	(716) 586-0378	RHODE ISLAND		A B C Comm./Seattle	(206) 364-8300
Computerland/Buffalo	(716) 836-6511	Computer City/Providence	(401) 331-2187	Almac-Stroom/Bellevue	(206) 643-9992
Home Computer Ctr./Rochester	(716) 244-6237	Computer Power/Warwick	(401) 738-4477	Amateur Radio Supply Co./Seattle	(206) 767-3222
Micro Age Computer Store/Rochester	(716) 244-9000	Computerland/Providence	(401) 274-5100	Byte Shop/Seattle	(206) 622-7196
Modern Tek Shop, Inc./Snyder	(716) 839-5800	SOUTH CAROLINA		Central Computers/Bellevue	(206) 746-5227
Readout Computers/Buffalo	(716) 634-9354	Colsmo Comm/Rockhill	(803) 366-7157	City News/Bellevue	(206) 455-9683
All Things Computer/Scarsdale	(914) 723-6262	Computerland/Anderson	(803) 224-5428	Computer & Video Ctr./Vancouver	(206) 695-1540
Computer Corner/White Plains	(914) 949-3282	SOUTH DAKOTA		Computerland	(206) 581-0388
Computer Store/White Plains	(914) 428-1661	Computerland/Rapid City	(605) 348-5384	Data-Borne Computers/Renton	(206) 248-0101
Heathkit/N. White Plains	(914) 761-7690	Computerland/Sioux Falls	(605) 338-5263	Empire Electrs./Seattle	(206) 244-5200
Mr. Computer/Wappinger Falls	(914) 297-1223	TENNESSEE		Heathkit	(206) 682-2172
Mr. Oz News Center Book Store/ New City	(914) 638-0990	Campus Computers/Nashville	(615) 327-9123	Heathkit	(206) 246-5357
Programs Unlimited/White Plains	(914) 761-9283	Chattanooga Computer Ctr.	(615) 892-7038	Omega Computers/Bellevue	(206) 455-1138
NORTH CAROLINA		Computerland/Knoxville	(615) 693-8225	Omega Computers/Seattle	(206) 522-0220
Byte Shop/Charlotte	(704) 568-8100	Eastern Micro Computer/Knoxville	(615) 594-8365	Omega Computers/Lynnwood	(206) 775-7585
Computer Alternatives/Asheville	(704) 274-5404	Rush Elects/Bristol	(615) 764-0831	Swan Computers, Inc./Bellevue	(206) 454-6272
Computerland/Charlotte	(704) 377-9821	Computer Lab/Memphis	(901) 761-4743	Western Micro Computer Ctr.	(206) 454-6272
K & S Newstand/Winston-Salem	(919) 724-7537	Computerland/Memphis	(901) 767-0233	The Xerox Store/Redmond	(206) 643-2600
Liberty News & Beverage/Durham	(919) 493-1180	Tobacco Corner/Memphis	(901) 682-3326	The Xerox Store/Tukwila	(206) 575-1212
Worldwide News & Specialties/Cary	(919) 467-7130	TEXAS		Alpha Computer Sys./Kennewick	(509) 586-7603
NORTH DAKOTA		Compu Shop/Richardson	(214) 783-1252	Personal Computers/Spokane	(509) 534-3955
Computerland/Fargo	(701) 237-3069	Computer Video Sys./Plano	(214) 423-3654	Rob Roy Computer Shop/Yakima	(509) 575-7704
Computerland/Grand Forks	(701) 746-0491	Computerland/Longview	(214) 663-3202	WISCONSIN	
OHIO		Computerland/Richardson	(214) 363-2223	Asmus Electronics/Fond Dulac	(414) 923-4107
All Media Material	(216) 678-5499	Computerland/Tyler	(214) 581-7000	Byte Shop/Milwaukee	(414) 281-7004
American Bookstore/New Parma	(216) 888-8210	Simtec/Dallas	(214) 484-3319	Chester Electr. Supply/Kenosha	(414) 658-4616
Basic Computer Shop	(216) 867-0808	Software Concepts/Dallas	(214) 458-0330	Computerland of Ozaukee	(414) 242-9490
Cleveland Computer Co.	(216) 946-1722	Softwares/Dallas	(214) 644-5043	Computers Unlimited/Milwaukee	(414) 355-5206
Computer Warehouse/Euclid	(216) 481-1600	Computer 'N' Things/Austin	(512) 453-5970	Computerworld/Appleton	(414) 733-9547
Computerland/Akron-Canton	(216) 493-7786	Computer Shop/San Antonio	(512) 828-0553	Digital Den/Wauwatosa	(414) 475-6020
Computerland/Warren	(216) 544-4191	Computer Solutions/San Antonio	(512) 341-8851	Four J's/Milwaukee	(414) 466-8990
The Corner Store/Median	(216) 722-2777	Computer To-Go/Austin	(512) 472-8926	North Shore Computers	(414) 963-9700
Cosmic Comics/Cleveland	(216) 784-3449	Computerland	(512) 724-1551	Prospect News/Milwaukee	(414) 276-6110
Hudson Computer/Hudson	(216) 653-9010	Computerland/Austin	(512) 452-5701	American Computer Sys./Madison	(608) 257-1348
News Depot/Canton	(216) 454-4444	Computerland of Austin II	(512) 327-7044	Computerland/LaCrosse	(608) 781-2090
The Newstand/Cuyahoga Falls	(216) 235-9321	Douglas Electronics/Corpus Christi	(512) 883-5103	Computerland/Madison	(608) 273-2020
Abacus II/Toledo	(419) 865-1009	Expensive Toys/Big Boys/San Antonio	(512) 340-5600	Computerland/Eau Claire	(715) 835-8082
Computer Connection/Lima	(419) 222-6464	Heathkit/San Antonio	(512) 341-8876	WEST VIRGINIA	
Leo's Book & Wine Shop/Toledo	(419) 255-5506	The Right Stuff/Austin	(512) 346-1321	Computer Store/Charleston	(304) 345-1360
The Open Book/Findlay	(419) 423-1283	Micro Age Computer Store/Houston	(602) 894-9247	Computerland/Clarksburg	(304) 624-6409
Future Now/Cincinnati	(513) 791-4700	City Electr. Supply/Houston	(713) 821-1060	Computerland/S. Charleston	(304) 744-7962
Micro Computer Ctr.	(513) 435-9355	Computer Center/Houston	(713) 527-8008	Computerland/Parkersburg	(304) 485-6823
News - Readers	(513) 879-4444	The Computer Store	(713) 846-7766	Nicks News/Huntington	(304) 697-2459
Micro Age Computer Store	(614) 868-1550	Computer Technique/Houston	(713) 947-9633	WYOMING	
Micro Center/Columbus	(614) 486-5381	Computercraft/Houston	(713) 977-0664	Computerland/Casper	(307) 234-2879
OKLAHOMA		Computerland/Houston Bay	(713) 488-8153	Computerland/Cheyenne	(307) 634-9552
Book Shack/Enid	(405) 233-1588	Computerland/Westwood	(713) 270-1200	CANADA	
Computer Service Unlimited/Norman	(405) 329-2154	D. Armstrong Co., Inc./Houston	(713) 957-4818	Galatica Computers	(403) 424-7007
Computer Works/Stillwater	(405) 624-5276	Lone Star News/Houston	(713) 981-0288	Micron Dist.	(416) 361-0609
Computerland/Oklahoma	(405) 755-5200	Micro Age Computer Store	(713) 270-9647	Lichtman's News	(416) 961-1466
		Micro Age Computer Store	(713) 440-7547	Computer Circuit	(510) 672-9370
				Computer World	(604) 732-1485
				Conte Electrs.	(604) 324-0505
				Minitrronics	(604) 872-3225

FREE CATALOG



NEW!
CATALOG OF
HARD-TO-FIND
PRECISION TOOLS

*Also contains test equipment
plus wide selection of
tool kits and cases*

Jensen's new catalog is jam-packed with more than 2000 quality items. Your single source for hard-to-find precision tools and tool kits used by electronic technicians, scientists, engineers, instrument mechanics, schools, laboratories and government agencies. Send for your free copy today!



JENSEN TOOLS INC.
7815 S 46TH STREET PHOENIX, AZ 85040

CIRCLE 182

LABELS

2.99
perM

15/16" x 3 1/2"
1 up - pin feed

white pressure
sensitive

PRICE INCLUDES SHIPPING

Packed 5M per box - Min. order 1 box - \$14.95
Check with order - Mass Residents add 5% Sales Tax



CHECK-MATE™
P.O. Box 103, Randolph, MA 02368
Telephone: 617-963-7694
CALL TOLL FREE 1-800-343-7706

CIRCLE 184

NEW FOR YOUR APPLE!!

ENCRYPTION is the means to keep your private affairs private.

CLASSIFIED™ is the software package that will encrypt any of your DOS 3.3 files (such as a VisiCalc file).

\$39.50 postpaid (U.S.A. or Canada).
48K & DOS 3.3 is required.



PASSAGE RESEARCH
945 Turquoise St., Ste. G
San Diego, CA 92109
(714) 488-5358

COMING NEXT MONTH

Voice Command

Speak and it computes. That's the promise of the future. Here's a look at the state of the art—what's available now, what's likely to be available when, and what computers that listen will be able to do for you.

Comfortable Computing

Computers extend the human mind, but the body has to fit in, too. We'll share what users have learned—sometimes the hard way—about furniture and workstation configurations.

As Christmas Draws Nigh

Santa might want to think about a super family gift. What are the considerations for the family system—a system for the home? We'll give you some alternatives to ponder, together with some hints to drop in case Santa wants to receive as well as give.

Controlling Payables

When a business (or a family) pays bills too quickly, cash runs short. When payment is too slow, credit is imperiled. Here's how to use personal computing to pay the payables at just the right time.

The Electronic Salesman . . .

. . . May never replace the human huckster, but a personal computer can give a big assist—particularly when the customer must deal with an overload of choices. We'll take you through the development of a selling application that can be adapted to a wide range of situations.

ASTROLOGY INFORMATION GROUP

• Computer-calculated natal charts • Qualified personal interpretation

Chart & Symbol Key \$10.00

Chart, Key & Interpretation \$30.00

Complete Services & Information:

(send name, birthdate, place, exact time & current address)

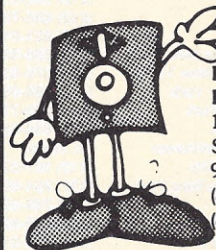
ASTROLOGY INFORMATION GROUP

P.O. Box 177

Davenport, CA 95017

MEMOREX FLEXIBLE DISCS

WE WILL NOT BE UNDER-SOLD!! Call Free (800)235-4137 for prices and information. Dealer inquiries invited and C.O.D.'s accepted.



PACIFIC EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA 93401. In Cal. call (800)592-5935 or (805)543-1037

CIRCLE 183



PROFESSIONAL COMPUTER CASSETTES

TRS-80* - APPLE - COMMODORE-ATARI
Instant Play Sliding Lock Out Doors



Micro-comp Cassettes

Maxell Computer tape

CERTIFIED AT 1600 FCI ONE YEAR WARRANTY
List price Micro-comp starting at \$3.95-Head Cleaner \$3.95

SPECIAL INTRODUCTORY OFFER!

MICRO-COMP MODEL	UNIT PRICE	10 PACK
C-10 (50 feet)	\$2.95 <input type="checkbox"/>	\$20.00 <input type="checkbox"/>
C-20 (TRS-80*) (100 feet)	3.15 <input type="checkbox"/>	22.00 <input type="checkbox"/>
C-30 (150 feet)	3.35 <input type="checkbox"/>	24.00 <input type="checkbox"/>
C-60 (300 feet)	3.55 <input type="checkbox"/>	26.00 <input type="checkbox"/>
Head Cleaner	2.95 <input type="checkbox"/>	20.00 <input type="checkbox"/>

*TRS-80-trademark of the Tandy Corp.

☐ CHECK ☐ MASTER CHARGE ☐ VISA

Card Account No. _____ Expiration Date _____

Name _____

Address _____

City _____ State _____ Zip _____

Mail checks to: Magnetic Information Systems (203)735-6477

P.O. Box 806, Shelton, CT 06484

Dealer's Inquiries Welcomed • Minimum order for credit cards \$10.00

CIRCLE 185

TAKE A BYTE OUT OF YOUR SOFTWARE COST!

Save 20-40% on all major
Brands of micro-software-hardware

SPECIAL

VISICALC \$ 175.00

VIDEOTERM \$ 230.00

NOW CARRYING HARDWARE

C. ITOH \$1596.00

NEC GREEN SCREENS . . . \$ 180.00

SOFTWARE GALORE backs its commitment of service and quality to its members.

If you buy any software from us and you are unhappy with it just return it for a full credit on your next order. 90 day unconditional warrantee on Software.

SOFTWARE GALORE We are a Membership Based Service
Orders (800) 423-6326, California/
Catalog (213) 827-1851
P.O. Box 10005 • Marina del Rey, California 90291

CIRCLE 187

Get Serious About

ZX81

Computing

PROFESSIONAL KEYBOARD. Makes your ZX81 easier to use. Enter programs quickly and error-free. Plugs straight into your ZX81 without any soldering. Has 47 keys and a full space bar. **\$85.00**

32K RAM. Expand the memory capacity of your ZX81 with this direct-plug-in module. Fully compatible with Sinclair's 16K RAM (to give your ZX81 system a full 48K). **\$99.95**

64K RAM. Expand your ZX81 memory capacity to its maximum. Plugs in directly to your ZX81. **\$149.95**

Software on Cassette

MULTIFILE PLUS.

GAMES

Data storage system for 16K to 64K systems. Flexible, user-defined setup. Includes program tape, detailed instruction manual, 3 data tapes, storage case.

\$34.95

MAZOGS
A maze-adventure
INVADERS
10 levels of play
STAR TREK
Zap the Klingons
DICTATOR
Political adventure

\$9.95

\$9.95

\$9.95

\$9.95

\$14.95

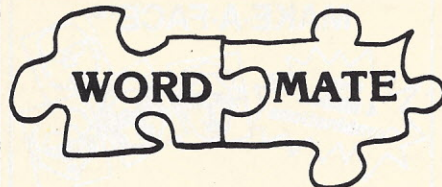
Call (716) 874-5510 for Visa, MC Orders.

GLADSTONE Electronics

Mail order to 1585 Kenmore Ave., Buffalo N.Y. 14217
Checks or money orders. No CODs. Add shipping.

Circle Reader # for ZX81 Catalogue

CIRCLE 189



Play against the computer to match words that make compound words.

- Contains 10 word lists (100 words in all)
- Large easy-to-read letters
- Full color
- Sound

Apple II, 48K Disk **\$25.00**
Applesoft (DOS 3.2/3.3)

ATARI 16K Cassette **\$20.00**

ATARI 24K Disk **\$25.00**

I.H.E.S.I.S.

P.O. Box 147
Garden City, MI 48135
(313) 595-4722

Please add:
\$2.00 ship/hand.
\$1.50 C.O.D.

Write for
Free Catalog
Dealer Inquires
Welcome

CIRCLE 188

5 1/4" Floppy Disk Drives

(Direct IBM® Plug-in)

TANDON Model TM 100-1 .. \$199* ea.

TANDON Model TM 100-2 .. \$299* ea.

12" Green Phosphor Zenith Monitor .. \$109* ea.

Also available - TM 602S, 603S, and
603E Winchester Drives.

For info or orders

call — 316-683-9225

or 316-685-9445

MC / VISA or C.O.D. with certified check
or money order. Kansas residents add
3% sales tax.

* Plus shipping.



G-H Computer Systems, Inc.
923 Longfellow Street
Wichita, KS 67207

CIRCLE 186

LEARN

Having trouble
learning to use
your computer?

Reference manuals don't teach. Most BASIC
texts don't cover specific personal computers.

**TIS solves these problems
with step-by-step books
tailored for your machine.**

For PET/CBM

Understanding Your PET/CBM **\$16.95**

Vol 1: Basic Programming

PET Graphics **\$ 6.95**

For OSI CIP/C4P

Understanding Your CIP/C4P **\$ 9.95**

A Workbook of BASIC Exercises

For VIC

Understanding Your VIC **\$13.95**

Vol. 1: Basic Programming

Money Back Guarantee. VISA/MC accepted.

All prices include UPS or 1st Class postage.

TIS inc

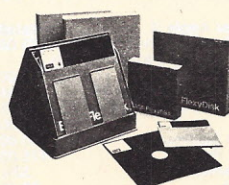
Total Information Services, Inc.
Box 921, Dept. PC
Los Alamos, NM 87544



CIRCLE 190



BASF



the **LEADER**
of the pack . . .

Write for free catalog with more than 400 fantastic
values for all your word and data processing needs.
Outside USA, enclose \$1.00.

ABM PRODUCTS

8868 CLAIREMONT MESA BLVD.
SAN DIEGO, CALIFORNIA 92123

Toll Free 800-854-1555 Orders Only
For information or California Orders
(714) 268-3537

CIRCLE 191

ELIZA IS HERE!

AT LAST! A FULL IMPLEMENTATION of the original ELIZA
program is now available to run on your microcomputer!

Created at MIT in 1966, ELIZA has become the world's most
celebrated artificial intelligence demonstration program. ELIZA is
a non-directive psychotherapist who analyzes each statement as
you type it in and then responds with her own comment or question
— and her remarks are often startlingly appropriate!

Designed to run on a large mainframe, ELIZA has hitherto been
unavailable to personal computer users except in greatly stripped
down versions lacking the sophistication which made the original
program so fascinating.

Now, our new microcomputer version possessing the **FULL** power
and range of expression of the original is being offered at the
introductory price of only \$25. And if you want to find out how she
does it (or teach her to do more) we will include the complete
Source Program for only \$20 additional.

Order your copy of ELIZA today and you'll never again wonder how
to respond when you hear someone say "Okay, let's see what this
computer of yours can actually do!"

ELIZA IS AVAILABLE IN THE FOLLOWING DISK FORMATS:

1. Standard 8 inch single density for all CP/M based computers
\$25 for ELIZA.COM - add \$20 for Microsoft BASIC-80 Source
2. 5 1/4 inch CP/M for Apple II equipped with Z-80 SoftCard
\$25 for ELIZA.COM - add \$20 for Microsoft BASIC-80 Source
3. 5 1/4 inch for 48K Apple II with Applesoft ROM and DOS 3.3
\$25 for Protected File - add \$20 for Applesoft Source
4. 5 1/4 inch for 64K IBM Personal Computer
\$25 for Protected File - add \$20 for IBM Disk BASIC Source
5. 5 1/4 inch for Osborne I Microcomputer
\$25 for Protected File - add \$20 for Microsoft BASIC-80 Source

ARTIFICIAL INTELLIGENCE RESEARCH GROUP

921 NORTH LA JOLLA AVENUE - DEPT. H
LOS ANGELES, CALIFORNIA 90046
(213) 656-7368 (213) 654-2214

MC, VISA and CHECKS ACCEPTED



CIRCLE 192

PRICE BREAK

**EPSON
MX-80
CARTRIDGE RIBBONS**

\$9.95 EA.

\$107.46 per dozen
Minimum Order 3 Ribbons
Price Includes Shipping
We accept Mastercard and Visa

CHECK-MATE™
P.O. BOX 103, RANDOLPH, MA 02368
Call Toll Free - 1-800-343-7706
In Massachusetts - 617-963-7694

CIRCLE 193

DISKETTES

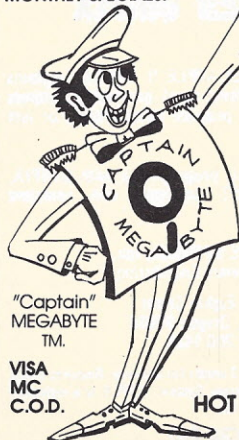
GUARANTEED **100% ERROR FREE**

5 1/4 SS/SD

19.95

(add \$2.00 per box
for less than 100. ..)

WATCH FOR THE CAPTAINS
MONTHLY SPECIALS!



"Captain"
MEGABYTE
TM.

VISA
MC
C.O.D.

**EPSON MX 80
RIBBONS**

\$6.00 ea.
Min 3.

SAVE 50 %
ON MOST
PRINTER RIBBONS

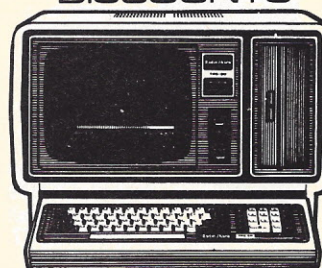
WESTWORLD

4699 S.W. 45th Street
Davie, Florida 33314
(305) 587-1130

HOT LINE 800-327-1013

CIRCLE 194

**TRS-80
COMPUTER
DISCOUNTS**



**FREE
Price List**

800-257-5556

IN N.J. 609-769-0551

WOODSTOWN ELECTRONICS
Rt. 40E, Woodstown, N.J.

CIRCLE 198

ALL THE EXCITEMENT OF REAL HORSE RACING RIGHT AT HOME



ACT AS OWNER ▶ ACT AS TRAINER ▶ ENTER
HORSES IN RACE ▶ MOVE UP AND DOWN IN
CLASS ▶ SELECT JOCKEY ▶ STUDY PAST
PERFORMANCES ▶ PLACE YOUR BETS ▶ BE
YOUR OWN JOCKEY ▶ ACT AS RACING
SECRETARY ▶ SELECT CLASS OF RACE ▶
SELECT DISTANCE OF RACE ▶ SELECT PURSE
AMOUNT ▶ SELECT WEIGHT FOR HANDICAPS
▶ SELECT TURF OR MAIN TRACK

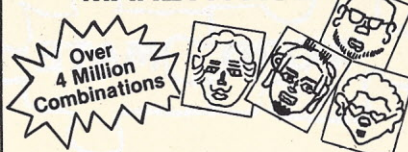
THRILL TO THE RUNNING OF THE RACE

SOFTWARE FOR TRS-80* MODEL I
OR III DISK SYSTEMS WITH 32K
HORSE/RA/CE AVAILABLE NOW AT \$39

COR-RAL SOFTWARE
P.O. BOX 284
TOMS RIVER, N.J. 08753

*TRS-80 is a registered trademark of the Tandy Corp.
CIRCLE 199

MAKE-A-FACE™



Combines your choice of each facial part
to draw a face on your monitor.

FUN for kids of all ages

EASY TO OPERATE

For use with Apple® II + 48K & disk.

\$24.95 on diskette
at your computer store,
or from:

SYSTEMS PLUS INC.
of Maryland

5215 Grenock Drive
Lothian, MD 20711
(301) 437-4411



Apple is a registered trademark of
Apple Computers, Inc.
MAKE-A-FACE is a trademark of
SYSTEMS PLUS Inc. of Maryland

CIRCLE 200

Stock Charting

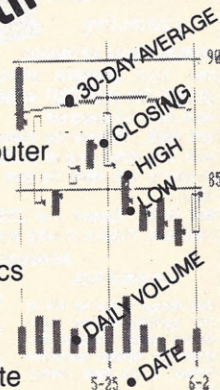
Use your IBM
Personal Computer
to Chart up to
20 Securities.
Requires 64K
& Color Graphics
Adapter

\$49.95

includes diskette
& Manual

Diamond Head Software

2937 Kalakaua Ave. Suite 28
Honolulu, HI 96815 PH: (808) 922-1113



CIRCLE 201

PRICE BREAK

**EPSON
MX-100**

CARTRIDGE RIBBONS

\$12.95 EA.

\$139.86 per dozen
Minimum Order 3 Ribbons
Price Includes Shipping

We accept Mastercard and Visa

CHECK-MATE™
P.O. Box 103, RANDOLPH, MA 02368
Call Toll Free—1-800-343-7706
In Massachusetts—617-963-7694

CIRCLE 202

MICRO FLASH

Best Prices Service in a Flash

All Products Guaranteed! Save Up To 40%!

Products for Apple II	Retail	Our Price
Microsoft Premium System	\$775.00	\$549.95
(Allows your Apple to run CP/M)		
Videx Videoterm	345.00	225.95
Videx Keyboard Enhancer II	149.95	104.95
Videx Visicalc/Videoterm Disk	49.95	38.95
DB Master	229.00	164.95
Wordstar & Mailmerge	500.00	259.95
EasyWriter Pro	175.00	122.95
Apple II Games	30% Off Retail!	
TG Joystick	59.95	41.95
3M Scotch Diskettes/Box 10	41.00	26.95

Many other products available for Apple,
IBM PC, & CP/M compatible computers

MICRO FLASH

120 Village Square, Suite 126

Orinda, CA 94563

(415) 680-1157

(Please call for shipping information)

Prices and items subject to change

APPLE II Trademark of Apple Computers, Inc.
IBM PC Trademark of IBM Corporation
CP/M Trademark of Digital Research, Inc.

CIRCLE 203

GENERAL BUSINESS PROGRAMS FOR TRS-80

MAILPACK—A program which will inter-
face our 'KWIKRITE' and our 'CUSTOMER' to
allow mass mailings or selective mailings
to your accounts. Requires CUSTOMER
and KWIKRITE. For this module only, Model I
or Model III **\$39.50**. Special for all 3,
CUSTOMER, KWIKRITE, MAIL SOME **\$129.50**.

Many other programs available. REAL
ESTATE PROGRAMS for escrow accounting,
closing statements, investment. Don't be
deceived by our LOW PRICES! This is quality
software with good instruction manuals.
FREE comprehensive catalog available
upon request!

SIMPLIFIED SOFTWARE SERIES by

M. B. Rowe & Associates
118 Third Ave., N.W., Box 1192
Hickory, N.C. 28601

Include \$2.00 postage and
handling each program

MASTERCARD and VISA accepted
DEALER INQUIRIES INVITED

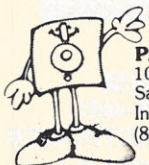
CIRCLE 204

Maxell Floppy Disks

The Mini-Disks
with maximum quality.



Dealer inquiries
invited. C.O.D.'s
accepted. Call
FREE (800) 235-4137.



PACIFIC EXCHANGES
100 Foothill Blvd., San Luis
San Luis Obispo, CA 93401.
In Cal. call (800) 592-5935 or
(805) 543-1037.

CIRCLE 205

APPLE II PASCAL USERS

??? Disk Directory Problems ???

??? Important Files Lost ???

??? Text or Code File Removed ???

YOU NEED DIRFIX

An essential program for all APPLE II PASCAL systems
that are used for professional word processing, business
data processing, PASCAL program development, or just
casually.

Only \$35 for the PASCAL program disk with DIRFIX,
COPYDISK and DIRLIST programs and complete
step-by-step instructions.

SEVEN MILE SYSTEMS, Inc.
Quality Software Engineering

420 East Eighth Street
The Dalles, Oregon 97058
(503) 296-1436

Checks only please. Allow 2 to 3 weeks for delivery. Requires a 48K
APPLE II with PASCAL Language System. APPLE is a registered
trademark of Apple Computer, Inc.

CIRCLE 206

POCKET COMPUTER USERS

Here is what you have been looking for to
protect and transport your complete TRS-80,
PC-1, PC-2 or Sharp PC-1211, PC-1500 Pocket
Computer System.

THE PC SYSTEM ATTACHE CASE

A durable, handsomely molded black case
with two drawbolt keylocks. The interior
has a soft foam lining which is cut to safely
hold all this:

- Pocket Computer
- Printer/Interface
- Power Supply/Charger
- Small Tape Recorder*
- Two Rolls of Printer Paper
- Plus Room For Manuals Etc.

PLEASE SPECIFY:

PC-1, PC-1211 SYSTEM CASE - 54.50

PC-2, PC-1500 SYSTEM CASE - 59.50

*Instructions Included On How To Make Cut
Out For Your Own Small Tape Recorder

SHALE DIVERSIFIED ENTERPRISES
108 Ferris Ave., Chardon, Ohio 44024

CIRCLE 207

Many of *Personal Computing's* advertisers will send further information about their products and services. Simply circle (on the readers' service card) the bold number that appears to the left of the advertiser's name in the list below. If there is no number listed on the left, kindly write or call the advertiser.

Circle No.	Page No.	Circle No.	Page No.	Circle No.	Page No.
161	Aardvark Technical Services	262	41	Dynax/Div. of Kanematsu-Gosho, (U.S.A., Inc.)	108
191	ABM Products	269	21	Dysan Corp.	104, 105
	Advanced Computer Products	264-19	25	Edu-Ware Services, Inc.	118, 119
121	Advanced Operating Systems	208	12, 145	800 Software	21, 233
	The Alien Group	264-6	164	EK Type Offices	264-11
197	Alphanetics	264-4	48	Elek-Tek, Inc.	253
78	Alpine Software, Inc.	167	43	Epson America, Inc.	130, 131
	Ancle Labs	264-11	33	Franklin Computer Corp.	66, 67
55	Apple Computer	140	72	Frederick E. Deeg & Associates	174
156	Applefest	248	105	F.Y.I., Inc.	191
89	Apple Tree Electronics	174	186	G.H. Computer Systems	269
146	Appware	234	189	Galdstone Electronics, Inc.	269
	Applied Creative Technology, Inc.	194		Graphics for Management	264-7
42	Applied Software Technology	177	132	The Happy Computer	218
45	Archives	123	175	Harcourt, Brace & Jovanovich	264-3
130	ARCsoft Publishers	216	177	Hayden Book Company	261, 264-12
192	Artificial Intelligence Research Group	269	170, 100, 169	Hayden Software Company	158, 184, 205
	Artworx Software Co.	52	135, 149, 154	Hayden Software Company	221, 238, 245
114, 173	ASAP	200, 256	20	Hayes Microcomputer Products	46
	Association/Data Processing Suppliers	264-18	26	Heath Company	65
	Audio Magazine	81		Howard Software Services	15
70	Avant-Garde Creations	160	3	IBM Corporation	4
23	Bausch & Lomb, Inc./ Instruments & Systems Division	99	47	InnoSys, Inc.	86
	Beaman Porter, Inc.	264-7	118	Innovative Computer Products	206
39	Bible Research Systems	164	120	Innovative Software	235
	The Bottom Line	217	17	I.U.S.	32
43	BPI Systems	120	182	Jensen Tools, Inc.	268
133	BT Enterprises	220	155	Jimscot, Inc.	246
79	Byte Industries	168	17	Jini Micro-Systems	263
195	Calsoft	264-9	59	Kensington Microware Ltd.	232
83	Centennial Software	164	180, 167, 166	Krell Software Corp.	264-12
85	Centronics	151		Leading Edge Products, Inc.	272, C-3, C-4
46	Chang Labs	202		Learn, Inc.	264-20, 264-21
151	Charles Mann & Associates	240	111	The Learning Company	197
60	Chatsworth Data	154	125	Lexisoft, Inc.	212
184, 193, 202	Check Mate	268, 269, 270	116	Lightning Software	236
102, 103	CLOAD Magazine, Inc.	187, 188	136	Link Systems	223
	Coast Computer & Copier Supply	264-11	18	3M Company	75
10	Commodore, Inc.	36, 37	185	Magnetic Information Systems, Inc.	268
	Communications Electronics	264-17		Master Electronics	264-14
32	Compucore	264-3	22	Maxell Corporation of America	28
	Compuserve	165	204	M.B. Rowe & Associates	270
	Computer Apparatus	264-4	29	Memorex Media Products Group	73
119	Computer Case Co.	260	64	Memory Technologies, Inc.	150
112	Computer Discount of America	225	19	Memotech Corporation	45
153	Computer Discount Products	244		MFJ Enterprises, Inc.	264-12
152	Computer Mail Order	242, 243	171	MicroAge Computer Stores, Inc.	255
	Computer Outlet	264-10	99	Micro Business World	214
	Computer Shopper	264-8		Microcom	87
144	Computer Specialties	231		Micro Computer Service Center	264-18
	Computer Warehouse	264-15	174	Microcomputer Technology, Inc.	257
	Computer World Int'l, Inc.	264-2	138	MicroCon Software Centers	226
38	Computronics	107, 219		Micro Data Supplies	264-22
69	Comrex International	60	203	Micro Flash	270
115	Condor Computer Corp.	178		Microhouse	126, 127
159	Consumer Computer	250	36, 50	Micro Lab, Inc.	100, 139
90, 93	Context Management Systems	175, 179		Micromail	264-6
127	Contract Services Associates	207	158	Micro Management Systems	249
7	Corona Data Systems	9	14, 35	Microsoft, Inc.	17, 146, 147
199	Cor-ral Software	270		Micro Systems	264-14
9	Corvus Systems	12	160	Microtek, Inc.	251
58	Cover Craft Corp.	149	74	Mini Micro Mart	176
179	CPU Shop	247	2	Mountain Computer, Inc.	1
	Creative Computers	264-18	137	National Computer Shows	110
84	Cybernetics	180	96	National Integrated Software Services	183
31	Dakin 5	94, 95	172	Nebis Computer Forms	224
162	Data Match	252	1	NEC Home Electronics	C-2
150	DataSource Systems	103	16, 54	NEC Information Systems	27, 125
87	Datasouth Computer Corp.	173	27	NRI Schools	71
24	Davong Systems, Inc.	63	77	Nokidata Corp.	163
109	Decision Support Software	196	122	OMNI Resources	209
57	Delmart	169	88	On-Line Microcenters	143
201	Diamond Head Software	270	108	Orange Micro, Inc.	195
123	Dillithium Press	210	4	Osborne Computer Corp.	6
110	Dresselhaus Computer Products	196	183, 205	Pacific Exchanges	268, 270
95	Dymarc Industries	252		Palomar Computer Products	264-5
157	Dynacomp	85	80	Panasonic	170, 171
				Passage Research	268

SALES ADMINISTRATOR
Joy Nichols

SALES COORDINATOR
Anne Lacitignola

PROMOTION MANAGER
Leslie Bouffard

PUBLISHER
Robert J. Lydon

DISTRICT MANAGERS

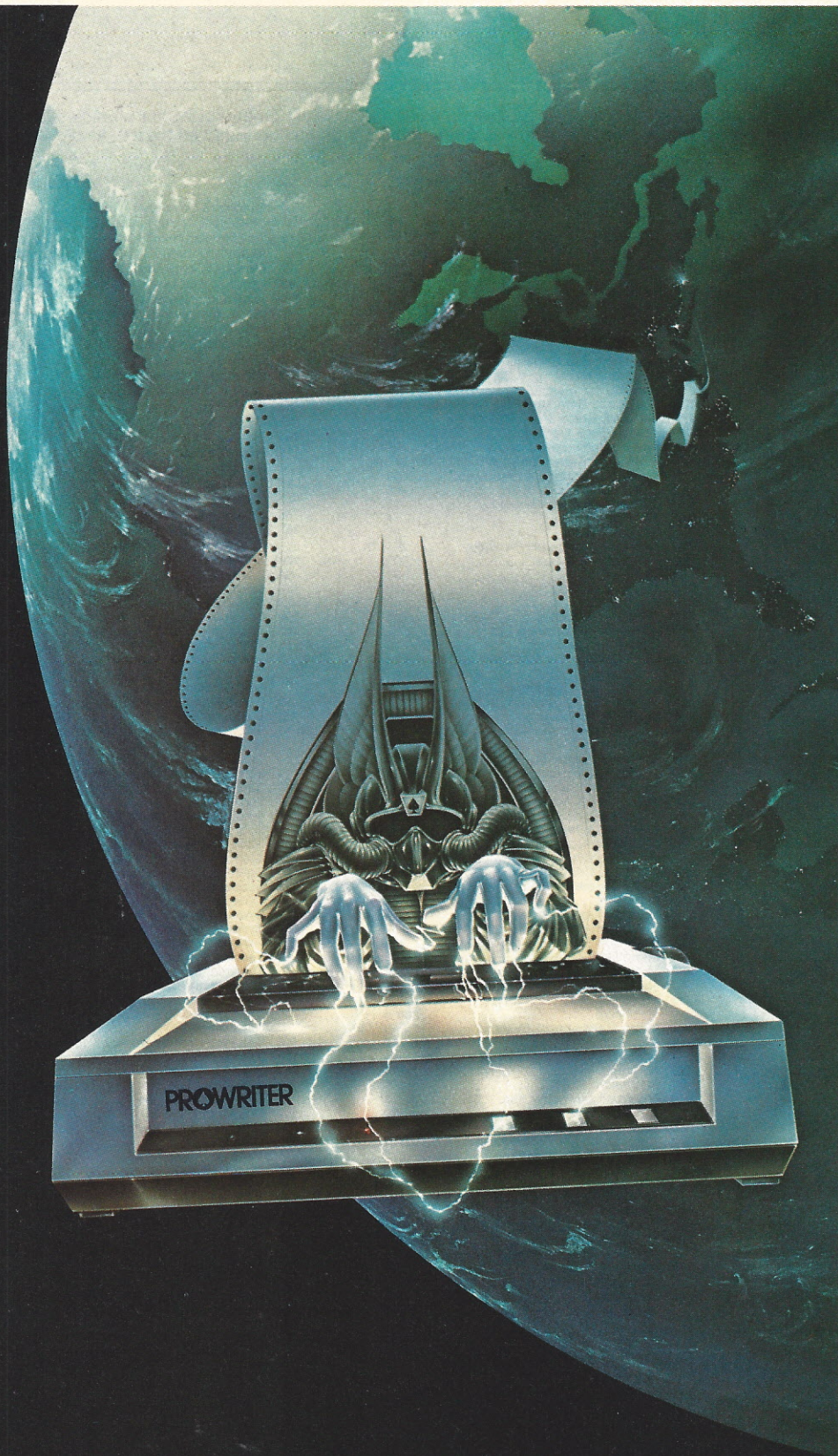
Ferris Ferdon (214) 231-0523
William Knickel (408) 736-6667
Scott McLean (213) 641-6544
Robert Pavone (201) 843-0550
Donna Quinn (408) 736-6667
Arlene Schulman (201) 843-0550

JAPAN

Haruki Hirayama 402-4556

THE PROWRITER COMETH.

(And It Cometh On Like Gangbusters.)



Evolution.

It's inevitable. An eternal verity.

Just when you think you've got it knocked, and you're resting on your laurels, somebody comes along and makes a dinosaur out of you.

Witness what happened to the Centronics printer when the Epson MX-80 came along in 1981.

And now, witness what's happening to the MX-80 as the ProWriter cometh to be the foremost printer of the decade.

SPEED

MX-80: 80 cps, for 46 full lines per minute throughput.

PROWRITER: 120 cps, for 63 full lines per minute throughput.

GRAPHICS

MX-80: Block graphics standard, fine for things like bar graphs.

PROWRITER: High-resolution graphics features, fine for bar graphs, smooth curves, thin lines, intricate details, etc.

PRINTING

MX-80: Dot matrix business quality.

PROWRITER: Dot matrix correspondence quality, with incremental printing capability standard.

FEED

MX-80: Tractor feed standard; optional friction-feed kit for about \$75 extra.

PROWRITER: Both tractor and friction feed standard.

INTERFACE

MX-80: Parallel interface standard; optional serial interface for about \$75 extra.

PROWRITER: Parallel and serial interface standard.

WARRANTY

MX-80: 90 days, from Epson.

PROWRITER: One full year, from Leading Edge.

PRICE

Heh, heh.

Distributed Exclusively by Leading Edge Products, Inc., 225 Turnpike Street, Canton, Massachusetts 02021. Call: toll-free 1-800-343-6833; or in Massachusetts call collect (617) 828-8150. Telex 951-624.

LEADING EDGE.

For a free poster of "Ace" (Prowriter's pilot) doing his thing, please write us.

THE LEADING EDGE IN PRINTERS

ONE GREAT LINE. ONE GREAT WARRANTY.

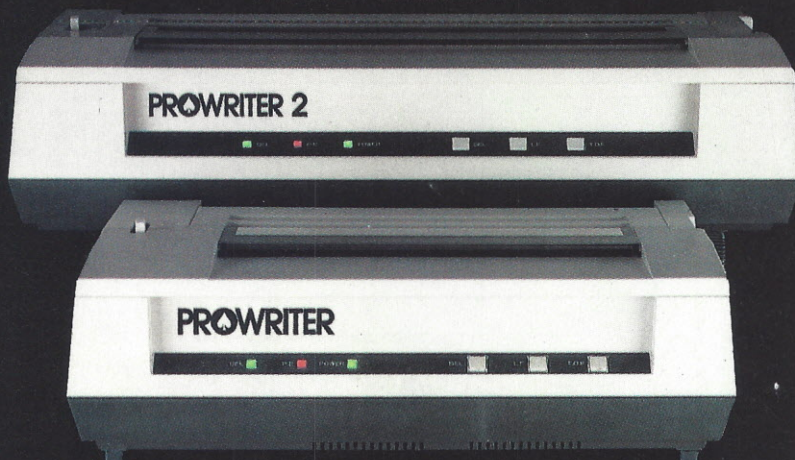
Finally, there's one full family of printers that covers every business or word processing application—all from C. Itoh, a company known for packing more product into less price; and all distributed exclusively by Leading Edge, a company known for searching out and providing that very thing. Which means that one call to one source can get you any printer, any time you need it, for any purpose. All backed by a full years warranty from Leading Edge. (Try *that* on any other line of printers.)

THE PRO'S.

The Prowriters: business printers—and more. The “more” is a dot-matrix process with more dots. It gives you denser, correspondence quality copy (as opposed to business quality copy, which looks like a bad job of spray-painting).

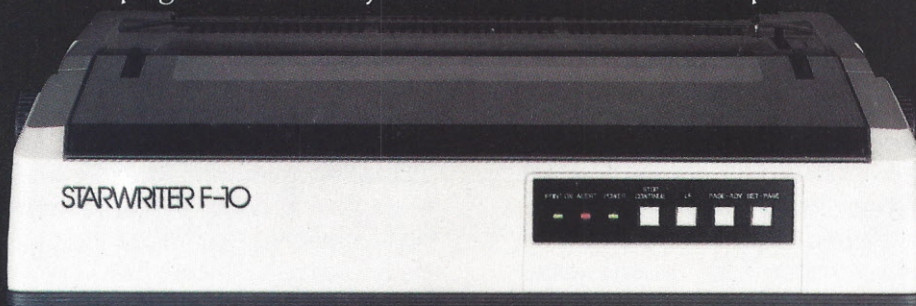
Prowriter: 120 cps. 80 columns dot matrix compressable to 136. 10" carriage. Parallel or serial interface.

Prowriter 2: Same as Prowriter, except 15" carriage allows full 136 columns in normal print mode. Parallel or serial interface.



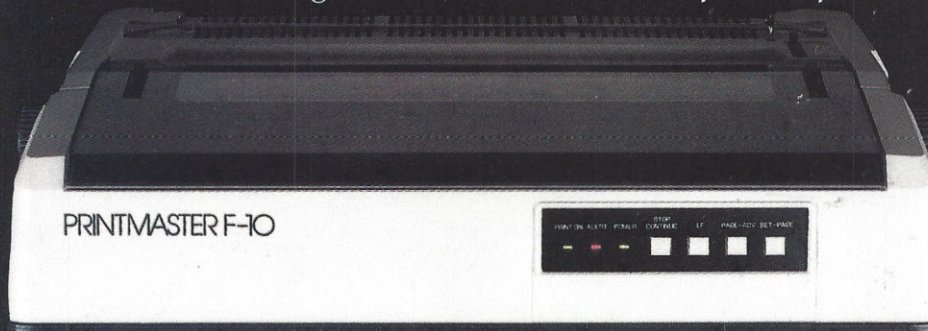
THE STAR.

The Starwriter F-10. In short (or more precisely, in a sleek 6" high, 30-pound unit), it gives you more of just about everything—except bulk and noise—than any other printer in its price range. It's a 40 cps letter-quality daisy-wheel with a bunch of built-in functions to simplify and speed up word processing. It plugs into almost any micro on the market, serial or parallel.



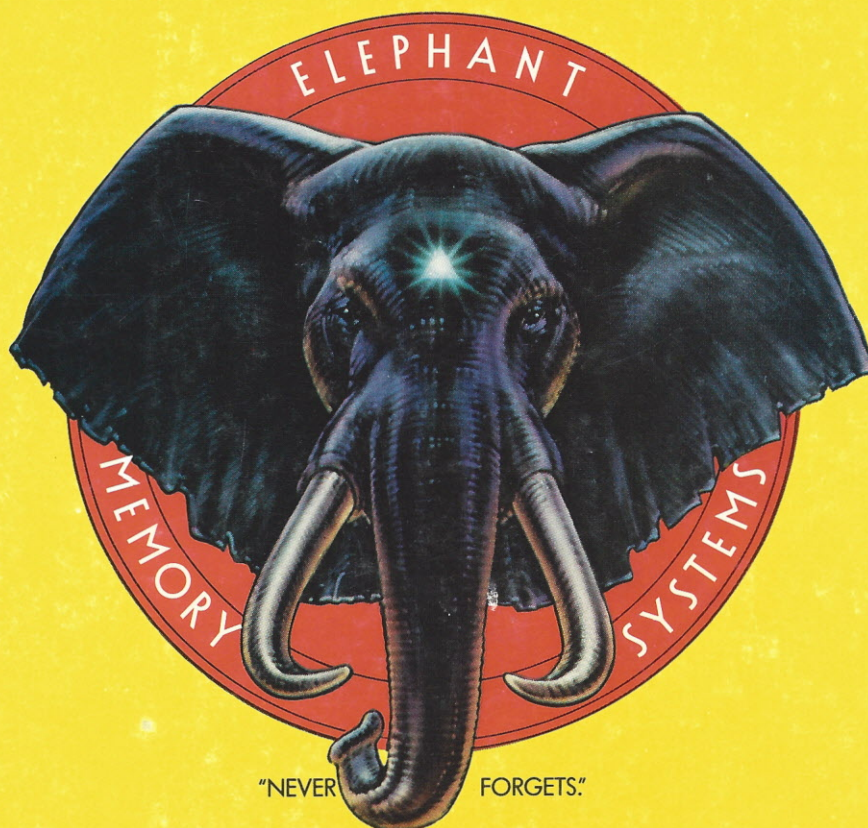
THE MASTER.

The Printmaster F-10. Does all the same good stuff as the Starwriter except, at 55 cps, the Master does it faster.



Distributed Exclusively by Leading Edge Products, Inc., 225 Turnpike Street, Canton, Massachusetts 02021.
Call: toll-free 1-800-343-6833; or in Massachusetts call collect (617) 828-8150. Telex 951-624.

REMEMBER:



MORE THAN JUST ANOTHER PRETTY FACE.

Says who? Says ANSI.

Specifically, subcommittee X3B8 of the American National Standards Institute (ANSI) says so. The fact is all Elephant™ floppies meet or exceed the specs required to meet or exceed all their standards.

But just who is "subcommittee X3B8" to issue such pronouncements?

They're a group of people representing a large, well-balanced cross section of disciplines—from academia; government agencies, and the computer industry. People from places like IBM, Hewlett-Packard, 3M, Lawrence Livermore Labs, The U.S. Department of Defense, Honeywell and The Association of Computer Programmers and Analysts. In short, it's a bunch of high-caliber nitpickers whose mission, it seems, in order to make better disks for consumers, is also to

make life miserable for everyone in the disk-making business.

How? By gathering together periodically (often, one suspects, under the full moon) to concoct more and more rules to increase the quality of flexible disks. Their most recent rule book runs over 20 single-spaced pages—listing, and insisting upon—hundreds upon hundreds of standards a disk must meet in order to be blessed by ANSI. (And thereby be taken seriously by people who take disks seriously.)

In fact, if you'd like a copy of this formidable document, for free, just let us know and we'll send you one. Because once you know what it takes to make an Elephant for ANSI . . .

We think you'll want us to make some Elephants for you.

ELEPHANT™ HEAVY DUTY DISKS.

For a free poster-size portrait of our powerful pachyderm, please write us.

Distributed Exclusively by Leading Edge Products, Inc., 225 Turnpike Street, Canton, Massachusetts 02021

Call: toll-free 1-800-343-6833; or in Massachusetts call collect (617) 828-8150. Telex 951-624.